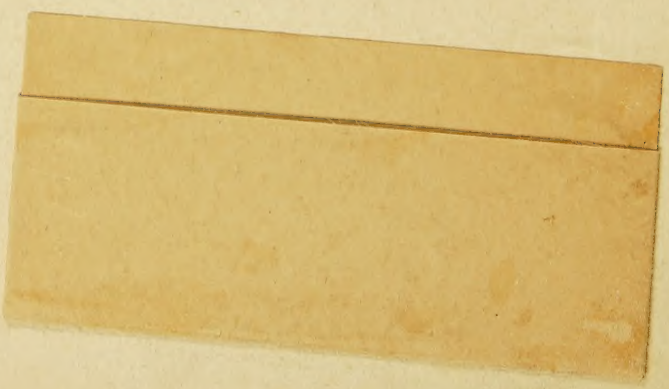
FARTHEST·NORTH:NANSEN

The 'Fram'



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THE NORWEGIAN POLAR EXPEDITION,
1893–1896.

"FARTHEST NORTH"

BY

DR. FRIDTJOF NANSEN

GOLD MEDALLIST, R.G.S.

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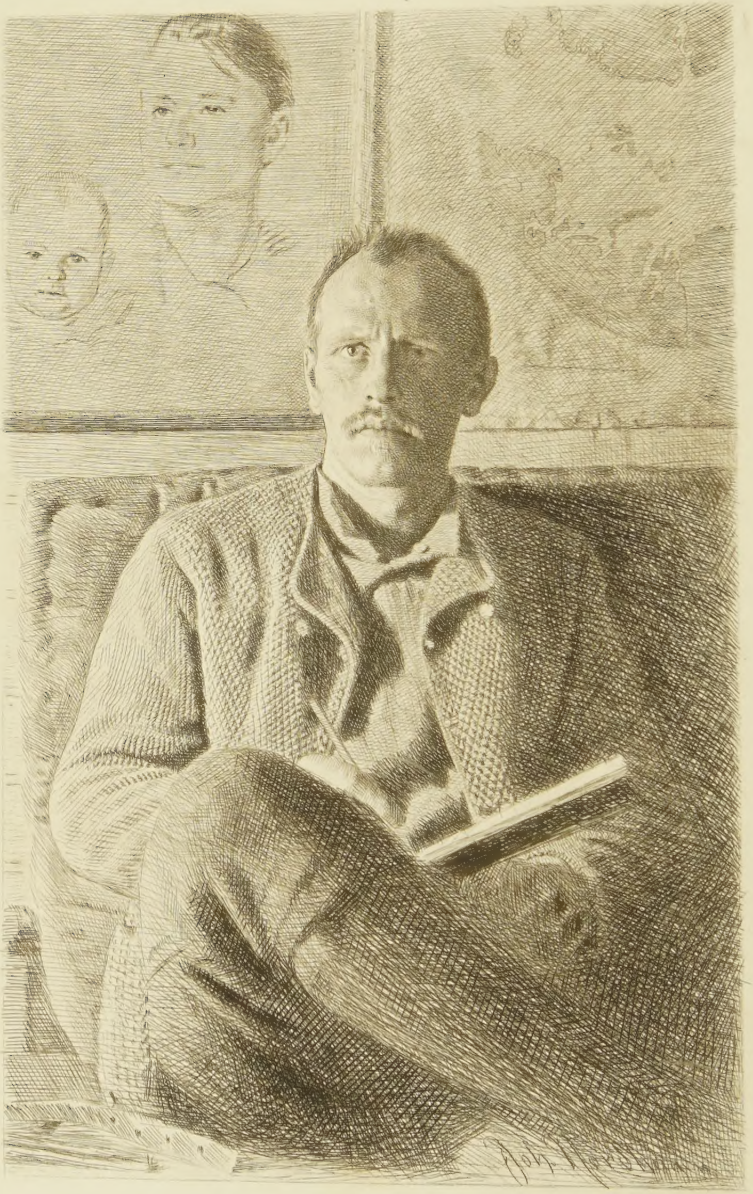

FRIDTJOF NANSEN'S

"FARTHEST NORTH"

BEING THE RECORD OF A VOYAGE OF EXPLORATION OF THE SHIP *FRAM* 1893-96 AND OF A FIFTEEN MONTHS' SLEIGH JOURNEY BY DR. NANSEN AND LIEUT. JOHANSEN WITH AN APPENDIX BY OTTO SVERDRUP CAPTAIN OF THE *FRAM*

ABOUT ONE HUNDRED AND TWENTY
FULL PAGE AND
NUMEROUS TEXT ILLUSTRATIONS
SIXTEEN COLOURED PLATES
IN FACSIMILE FROM
DR. NANSEN'S OWN SKETCHES
ETCHED PORTRAIT
PHOTOGRAVURES
AND MAPS

VOL. I

Westminster:
ARCHIBALD CONSTABLE AND COMPANY
2 WHITEHALL GARDENS
1897

LONDON
HARRISON AND SONS, ST. MARTIN'S LANE,
PRINTERS IN ORDINARY TO HER MAJESTY.

TO

H E R

WHO

CHRISTENED THE SHIP

AND

HAD THE COURAGE TO WAIT.

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General Map of the Polar Regions.

Preliminary Map of the Route of the *Fram* along the Northern Coast of the Old World.

PUBLISHER'S NOTE.

The Author had not originally contemplated the publication of the coloured sketches which are produced in this work. He has permitted their reproduction because they may be useful as showing colour effects in the Arctic; but he wishes it understood that he claims no artistic merit for them.

For permission to reproduce the map of Franz Josef Land in Julius Payer's "New Lands Within the Arctic Circle," the publishers are indebted to the courtesy of Messrs. Macmillan and Company.

FARTHEST NORTH

BEING THE NARRATIVE OF THE VOYAGE AND EXPLORATION OF THE *FRAM* 1893-96 AND THE FIFTEEN MONTHS' SLEDGE EXPEDITION BY DR. NANSEN AND LIEUT. JOHANSEN WITH AN APPENDIX BY OTTO SVERDRUP.

CHAPTER I.

Introduction.

"A time will come in later years when the Ocean will unloose the bands of things, when the immeasurable earth will lie open, when seafarers will discover new countries, and Thule will no longer be the extreme point among the lands."—Seneca.

Unseen and untrodden under their spotless mantle o ice the rigid polar regions slept the profound sleep of death from the earliest dawn of time. Wrapped in his white shroud, the mighty giant stretched his clammy ice-limbs abroad, and dreamed his age-long dreams.

Ages passed—deep was the silence.

Then, in the dawn of history, far away in the south, the awakening spirit of man reared its head on high and gazed over the earth. To the south it encountered warmth, to the north, cold ; and behind the boundaries of the unknown, it placed in imagination the twin kingdoms of consuming heat and of deadly cold.

But the limits of the unknown had to recede step by step before the ever-increasing yearning after light and knowledge of the human mind, till they made a stand in the north at the threshold of Nature's great Ice Temple of the polar regions with their endless silence.

Up to this point no insuperable obstacles had opposed the progress of the advancing hosts, which confidently proceeded on their way. But here the ramparts of ice and the long darkness of winter brought them to bay. Host after host marched on towards the north, only to suffer defeat. Fresh ranks stood ever ready to advance over the bodies of their predecessors. Shrouded in fog lay the mythic land of Nivlheim, where the "Rimturser"* carried on their wild gambols.

Why did we continually return to the attack ? There in the darkness and cold stood Helheim, where the death-goddess held her sway ; there lay Nåstrand, the shore of corpses. Thither, where no living being could draw breath, thither troop after troop made its way. To what end ? Was it to bring home the dead, as did

* Frost-giants.

Hermod when he rode after Baldur? No! It was simply to satisfy man's thirst for knowledge. Nowhere, in truth, has knowledge been purchased at greater cost of privation and suffering. But the spirit of mankind will never rest till every spot of these regions has been trodden by the foot of man, till every enigma has been solved.

Minute by minute, degree by degree, we have stolen forwards, with painful effort. Slowly the day has approached; even now we are but in its early dawn; darkness still broods over vast tracts around the Pole.

Our ancestors, the old Vikings, were the first Arctic voyagers. It has been said tha their expeditions to the frozen sea were of no moment. as they have left no enduring marks behind them. This, however, is scarcely correct. Just as surely as the whalers of our age, in their persistent struggles with ice and sea, form our outposts of investigation up in the north, so were the old Northmen, with Eric the Red, Leif and others at their head, the pioneers of the polar expeditions of future generations.

It should be borne in mind, that as they were the first ocean navigators, so also were they the first to combat with the ice. Long before other seafaring nations had ventured to do more than hug the coast lines, our ancestors had traversed the open seas in all directions, had discovered Iceland and Greenland, and had colonised

them. At a later period they discovered America, and did not shrink from making a straight course over the Atlantic Ocean, from Greenland to Norway. Many and many a bout must they have had with the ice along the coasts of Greenland in their open barks, and many a life must have been lost.

And that which impelled them to undertake these expeditions was not the mere love of adventure, though that is, indeed, one of the essential traits of our national character. It was rather the necessity of discovering new countries for the many restless beings that could find no room in Norway. Furthermore, they were stimulated by a real interest for knowledge. Othar, who about 890 resided in England at Alfred's Court, set out on an errand of geographical investigation; or, as he says himself, "he felt an inspiration and a desire to learn, to know, and to demonstrate how far the land stretched towards the north, and if there were any regions inhabited by man northward beyond the desert waste." He lived in the northernmost part of Helgeland, probably at Bjarköi, and sailed round the North Cape and eastwards, even to the White Sea.

Adam of Bremen relates of Harald Hårdråde, "the experienced king of the Northmen," that he undertook a voyage out into the sea towards the north and "explored the expanse of the northern ocean with his ships, but darkness spread over the verge where the world falls away, and he put about barely in time to escape being

swallowed in the vast abyss." This was Ginnungagap, the abyss at the world's end. How far he went, no one knows, but at all events he deserves recognition as one of the first of the polar navigators that were animated by pure love of knowledge. Naturally, these Northmen were not free from the superstitious ideas about the polar regions prevalent in their times. There, indeed, they placed their Ginnungagap, their Nivlheim, Helheim, and later on Trollebotn ; but even these mythical and poetical ideas contained so large a kernel of observation, that our fathers may be said to have possessed a remarkably clear conception of the true nature of things. How soberly and correctly they observed, may best be seen a couple of hundred years later in *Kongespeilet* ("The Mirror of Kings"), the most scientific treatise of our ancient literature, where it is said that "as soon as one has traversed the greater part of the wild sea, one comes upon such a huge quantity of ice that nowhere in the whole world has the like been known. Some of the ice is so flat that it looks as if it were frozen on the sea itself; it is from 8 to 10 feet thick, and extends so far out into the sea that it would take a journey of four or more days to reach the land over it. But this ice lies more to the north-east or north, beyond the limits of the land, than to the south and south-west or west . . . ."

"This ice is of a wonderful nature. It lies at times quite still, as one would expect, with openings or large

fjords in it; but sometimes its movement is so strong and rapid as to equal that of a ship running before the wind, and it drifts against the wind as often as with it."

This is a conception all the more remarkable when viewed in the light of the crude ideas entertained by the rest of the world at that period with regard to foreign climes.

The strength of our people now dwindled away, and centuries elapsed before explorers once more sought the northern seas. Then it was other nations, especially the Dutch and the English, that led the van. The sober observations of the old Northmen were forgotten, and in their stead we meet with repeated instances of the attraction of mankind towards the most fantastic ideas; a tendency of thought that found ample scope in the regions of the north. When the cold proved not to be absolutely deadly, theories flew to the opposite extreme and marvellous were the erroneous ideas that sprang up, and have held their own down to the present day. Over and over again it has been the same—the most natural explanation of phenomena is the very one that men have most shunned; and, if no middle course was to be found, they have rushed to the wildest hypothesis. It is only thus that the belief in an open polar sea could have arisen and held its ground. Though everywhere ice was met with, people maintained that this open sea must lie behind the

ice. Thus the belief in an ice-free north-east and north-west passage to the wealth of Cathay or of India, first propounded towards the close of the 15th century, cropped up again and again, only to be again and again refuted. Since the ice barred the southern regions, the way must lie further north ; and finally a passage over the Pole itself was sought for. Wild as these theories were, they have worked for the benefit of mankind ; for by their means our knowledge of the earth has been widely extended. Hence we may see that no work done in the service of investigation is ever lost, not even when carried out under false assumptions. England has to thank these chimeras in no small degree for the fact that she has become the mightiest seafaring nation of the world.

By many paths and by many means mankind has endeavoured to penetrate this kingdom of death. At first the attempt was made exclusively by sea. Ships were then ill-adapted to combat the ice, and people were loth to make the venture. The clinker-built pine and fir barks of the old Northmen were no better fitted for the purpose than were the small clumsy carvels of the first English and Dutch Arctic explorers. Little by little they learnt to adapt their vessels to the conditions, and with ever-increasing daring they forced them in among the dreaded floes.

But the uncivilised polar tribes, both those that inhabit the Siberian tundras, and the Eskimo of North

America, had discovered, long before polar expeditions had begun, another and a safer means of traversing these regions—to wit the sledge, usually drawn by dogs. It was in Siberia that this excellent method of locomotion was first applied to the service of polar exploration. Already in the 17th and 18th centuries the Russians undertook very extensive sledge journeys, and charted the whole of the Siberian coast from the borders of Europe to Bering Strait. And they did not merely travel along the coasts, but crossed the drift-ice itself to the New Siberian Islands, and even north of them. Nowhere, perhaps, have travellers gone through so many sufferings, or evinced so much endurance.

In America too the sledge was employed by Englishmen at an early date for the purpose of exploring the shores of the Arctic seas. Sometimes the toboggan or Indian sledge was used, sometimes that of the Eskimo. It was under the able leadership of M'Clintock that sledge journeys attained their highest development. While the Russians had generally travelled with a large number of dogs, and only a few men, the English employed many more men on their expeditions, and their sledges were entirely, or for the most part, drawn by the explorers themselves. Thus in the most energetic attempt ever made to reach high latitudes, Albert Markham's memorable march towards the north from the *Alert's* winter quarters, there were 33 men who had to draw the sledges, though there were plenty of dogs

on board the ship. During his famous expedition in search of Franklin, M'Clintock used both men and dogs.

The American traveller Peary has, however, adopted a totally different method of travelling on the inland ice of Greenland, employing as few men and as many dogs as possible. The great importance of dogs for sledge journeys was clear to me before I undertook my Greenland expedition, and the reason I did not use them then was simply that I was unable to procure any serviceable animals.*

A third method may yet be mentioned which has been employed in the Arctic regions—namely boats and sledges combined. It is said of the old Northmen in the Sagas and in the *Kongespeil*, that for days on end they had to drag their boats over the ice in the Greenland sea, in order to reach land. The first in modern times to make use of this means of travelling was Parry, who, in his memorable attempt to reach the Pole in 1827, abandoned his ship and made his way over the drift-ice northwards, with boats which he dragged on sledges. He succeeded in attaining the highest latitude (82° 45′) that had yet been reached ; but here the current carried him to the south more rapidly than he could advance against it, and he was obliged to turn back.

Of later years this method of travelling has not been much employed in approaching the Pole. It may,

* *First Crossing of Greenland*, Vol. I, p. 30.

however, be mentioned that Markham took boats with him also on his sledge expedition. Many expeditions have through sheer necessity accomplished long distances over the drift-ice in this way, in order to reach home after having abandoned or lost their ship. Especial mention may be made of the Austro-Hungarian *Tegethoff* expedition to Franz Josef Land, and the ill-fated American *Jeannette* expedition.

It seems that but few have thought of following the example of the Eskimo—living as they do, and, instead of heavy boats, taking light kayaks, drawn by dogs. At all events, no attempts have been made in this direction.

The methods of advance have been tested on four main routes: the Smith Sound route, the sea route between Greenland and Spitzbergen, Franz Josef Land route, and the Bering Strait route.

In later times, the point from which the Pole has been most frequently assailed is Smith Sound, probably because American explorers had somewhat too hastily asserted that they had there descried the open Polar Sea, extending indefinitely towards the north. Every expedition was stopped, however, by immense masses of ice, which came drifting southwards, and piled themselves up against the coasts. The most important expedition by this route was the English one conducted by Nares in 1875–76, the equipment of which involved a vast expenditure. Markham, the next in command to Nares, reached the highest latitude till then attained,

83° 20′, but at the cost of enormous exertion and loss; and Nares was of opinion that the impossibility of reaching the Pole by this route was fully demonstrated for all future ages.

During the stay of the Greely expedition from 1881 to 1884 in this same region, Lockwood attained a somewhat higher record, viz., 83° 24′, the most northerly point on the globe that human feet had trodden previous to the expedition of which the present work treats.

By way of the sea between Greenland and Spitzbergen, several attempts have been made to penetrate the secrets of the domain of ice. In 1607 Henry Hudson endeavoured to reach the Pole along the east coast of Greenland, where he was in hopes of finding an open basin and a waterway to the Pacific. His progress was, however, stopped at 73° north latitude, at a point of the coast which he named "Hold with Hope." The German expedition under Koldewey (1869–70), which visited the same waters, reached by the aid of sledges as far north as 77° north latitude. Owing to the enormous masses of ice which the polar current sweeps southward along this coast, it is certainly one of the most unfavourable routes for a polar expedition. A better route is that by Spitzbergen, which was essayed by Hudson, when his progress was blocked off Greenland. Here he reached 80° 23′ north latitude. Thanks to the warm current that runs by the west coast of Spitzbergen in a northerly direction, the sea is kept free from ice, and it is

without comparison the route by which one can the most safely and easily reach high latitudes in ice-free waters. It was north of Spitzbergen that Edward Parry made his attempt in 1827, above alluded to.

Further eastwards, the ice-conditions are less favourable, and therefore few polar expeditions have directed their course through these regions. The original object of the Austro-Hungarian expedition under Weyprecht and Payer (1872–74) was to seek for the North-East Passage; but at its first meeting with the ice, it was set fast off the north point of Novaya Zemlya, drifted northwards, and discovered Franz Josef Land, whence Payer endeavoured to push forwards to the north with sledges, reaching 82° 5′ north latitude on an island, which he named Crown Prince Rudolf's Land. To the north of this he thought he could see an extensive tract of land, lying in about 83° north latitude, which he called Petermann's Land. Franz Josef Land was afterwards twice visited by the English traveller Leigh Smith, in 1880 and 1881–82; and it is here that the English Jackson-Harmsworth expedition is at present established.

The plan of the Danish Expedition under Hovgaard was to push forward to the North Pole from Cape Chelyuskin along the east coast of an extensive tract of land which Hovgaard thought must lie to the east of Franz Josef Land. He got set fast in the ice, however, in the Kara Sea and remained the winter there, returning home the following year.

Only a few attempts have been made through Bering Strait. The first was Cook's in 1776; the last the *Jeannette* expedition 1879–81 under De Long, a Lieutenant in the American navy. Scarcely anywhere have polar travellers been so hopelessly blocked by ice in comparatively low latitudes. The last named expedition, however, had a most important bearing upon my own. As De Long himself says in a letter to Gordon Bennett, who supplied the funds for the expedition, he was of opinion that there were three routes to choose from, Smith Sound, the east coast of Greenland, or Bering Strait; but he put most faith in the last, and this was ultimately selected. His main reason for this choice was his belief in a Japanese current running north through Bering Strait and onwards along the east coast of Wrangel Land, which was believed to extend far to the north. It was urged that the warm water of this current would open a way along that coast, possibly up to the Pole. The experience of whalers showed that whenever their vessels were set fast in the ice here, they drifted northwards; hence it was concluded that the current generally set in that direction. "This will help explorers," says De Long, "to reach high latitudes; but at the same time will make it more difficult for them to come back." The truth of these words he himself was to learn by bitter experience.

The *Jeannette* stuck fast in the ice on September 6th,

1879, in 71° 35′ north latitude and 175° 6′ east longitude, south-east of Wrangel's Land—which, however, proved to be a small island—and drifted with the ice in a west-north-westerly direction for two years, when it foundered, June 12th, 1881, north of the New Siberian Islands, in 77° 15′ north latitude and 154° 59′ east longitude.

Everywhere, then, has the ice stopped the progress of mankind towards the north. In two cases only have ice-bound vessels drifted in a northerly direction—in the case of the *Tegethoff* and the *Jeannette*—while most of the others have been carried away from their goal by masses of ice drifting southwards.

On reading the history of Arctic explorations, it early occurred to me that it would be very difficult to wrest the secrets from these unknown regions of ice by adopting the routes and the methods hitherto employed. But where did the proper route lie?

It was in the autumn of 1884 that I happened to see an article by Professor Mohn in the Norwegian *Morgenblad*, in which it was stated that sundry articles which must have come from the *Jeannette* had been found on the south-west coast of Greenland. He conjectured that they must have drifted on a floe right across the Polar Sea. It immediately occurred to me that here lay the route ready to hand. If a floe could drift right across the unknown region, that drift might also be enlisted in the service of exploration—and my plan was laid. Some years, however, elapsed before, in

February, 1890, after my return from my Greenland Expedition, I at last propounded the idea in an address before the Christiania Geographical Society. As this address plays an important part in the history of the expedition, I shall reproduce its principal features, as printed in the March number of *Naturen*, 1891.

After giving a brief sketch of the different polar expeditions of former years, I go on to say—"The results of these numerous attempts, as I have pointed out, seem somewhat discouraging. They appear to show plainly enough that it is impossible to sail to the Pole by any route whatever ; for everywhere the ice has proved an impenetrable barrier, and has stayed the progress of invaders on the threshold of the unknown regions.

"To drag boats over the uneven drift-ice, which moreover is constantly moving under the influence of the current and wind, is an equally great difficulty. The ice lays such obstacles in the way that any one who has ever attempted to traverse it will not hesitate to declare it well-nigh impossible to advance in this manner with the equipment and provisions requisite for such an undertaking."

Had we been able to advance over land, I said, that would have been the most certain route ; in that case the Pole could have been reached "in one summer by Norwegian snow-shoe runners." But there is every reason to doubt the existence of any such land. Green-

land, I considered, did not extend further than the most northerly known point of its west coast. "It is not probable that Franz Josef Land reaches to the Pole; from all we can learn it forms a group of islands separated from each other by deep sounds, and it appears improbable that any large continuous track of land is to be found there.

"Some people are perhaps of opinion that one ought to defer the examination of regions like those around the Pole, beset, as they are, with so many difficulties, till new means of transport have been discovered. I have heard it intimated that one fine day we shall be able to reach the Pole by a balloon, and that it is only waste of time to seek to get there before that day comes. It need scarcely be shown that this line of reasoning is untenable. Even if one could really suppose that in the near or distant future this frequently mooted idea of travelling to the Pole in an air-ship would be realised, such an expedition, however interesting it might be in certain respects, would be far from yielding the scientific results of expeditions carried out in the manner here indicated. Scientific results of importance in all branches of research can be attained only by persistent observations during a lengthened sojourn in these regions; while those of a balloon expedition cannot but be of a transitory nature.

"We must, then, endeavour to ascertain if there are not other routes- and I believe there are. I believe

that if we pay attention to the actually existent forces of nature, and seek to work *with* and not *against* them, we shall thus find the safest and easiest method of reaching the Pole. It is useless, as previous expeditions have done, to work *against* the current; we should see if there is not a current we can work *with*. The *Jeannette* Expedition is the only one, in my opinion, that started on the right track, though it may have been unwittingly and unwillingly.

"The *Jeannette* drifted for two years in the ice, from Wrangel Land to the New Siberian Islands. Three years after she foundered to the north of these islands, there was found frozen into the drift-ice in the neighbourhood of Julianehaab on the south-west coast of Greenland, a number of articles which appeared, from sundry indubitable marks, to proceed from the sunken vessel. These articles were first discovered by the Eskimo, and were afterwards collected by Mr. Lytzen, Colonial Manager at Julianehaab, who has given a list of them in the *Danish Geographical Journal* for 1885. Among them the following may especially be mentioned :—

"1. A list of provisions, signed by De Long the commander of the *Jeannette*.

"2. An MS. list of the *Jeannette's* boats.

"3. A pair of oilskin breeches marked 'Louis Noros,' the name of one of the *Jeannette's* crew, who was saved.

"4. The peak of a cap on which, according to Lytzen's statement, was written *F. C. Lindemann.* The name of one of the crew of the *Jeannette,* who was also saved, was F. C. Nindemann. This may either have been a clerical error on Lytzen's part or a misprint in the Danish journal.

"In America when it was reported that these articles had been found, people were very sceptical and doubts of their genuineness were expressed in the American newspapers. The facts, however, can scarcely be sheer inventions; and it may therefore be safely assumed that an ice-floe bearing these articles from the *Jeannette* had drifted from the place where it sank to Julianehaab.

"By what route did this ice-floe reach the west coast of Greenland?

"Professor Mohn, in a lecture before the Scientific Society of Christiania in November, 1894, showed that it could have come by no other way than across the Pole.*

* Mr. Lytzen, of Julianehaab, afterwards contributed an article to the *Geografisk Tidsskrift* (8th Vol., 1885–86, pp. 49–51, Copenhagen), in which he expressed himself, so far at least as I understand him, in the same sense, and remarkably enough, suggested that this circumstance might possibly be found to have an important bearing on Arctic exploration. He says:—"It will therefore be seen that Polar explorers who seek to advance towards the Pole from the Siberian Sea will probably at one place or another be hemmed in by the ice, but

"It cannot possibly have come through Smith Sound, as the current there passes along the western side of Baffin's Bay, and it would thus have been conveyed to Baffin's Land or Labrador, and not to the west coast of Greenland. The current flows along this coast in a northerly direction, and is a continuation of the Greenland polar current, which comes along the east coast of Greenland, takes a bend round Cape Farewell, and passes upwards along the west coast.

"It is by this current only that the floe could have come.

"But the question now arises—what route did it take from the New Siberian Islands in order to reach the east coast of Greenland?

"It is conceivable that it might have drifted along the north coast of Siberia, south of Franz Josef Land, up through the sound between Franz Josef Land and Spitzbergen, or even to the south of Spitzbergen, and might after that have got into the polar current which flows along Greenland. If, however, we study the directions of the currents in these regions so far as they are at present ascertained, it will be found that this is extremely improbable, not to say impossible."

these masses of ice will be carried by the current along the Greenland coast. It is not, therefore, altogether impossible that, if the ship of such an expedition is able to survive the pressure of the masses of ice for any length of time, it will arrive safely at South Greenland; but in that case it must be prepared to spend several years on the way."

Having shown that this is evident from the *Tegethoff* drift and from many other circumstances, I proceeded :—

"The distance from the New Siberian Islands to the 80th degree of latitude on the east coast of Greenland is 1,360 miles, and the distance from the last-named place to Julianehaab 1,540 miles, making together a distance of 2,900 miles. This distance was traversed by the floe in 1,100 days, which gives a speed of 2·6 miles per day of 24 hours. The time during which the relics drifted after having reached the 80th degree of latitude, till they arrived at Julianehaab, can be calculated with tolerable precision, as the speed of the above-named current along the east coast of Greenland is well known. It may be assumed that it took at least 400 days to accomplish this distance; there remain, then, about 700 days as the longest time the drifting articles can have taken from the New Siberian Islands to the 80th degree of latitude. Supposing that they took the shortest route, *i.e.*, across the Pole, this computation gives a speed of about 2 miles in 24 hours. On the other hand, supposing they went by the route south of Franz Josef Land, and south of Spitzbergen, they must have drifted at much higher speed. Two miles in the 24 hours, however, coincides most remarkably with the rate at which the *Jeannette* drifted during the last months of her voyage, from January 1st to June 12th, 1881. In this time she drifted at an average rate of a little over 2 miles in the 24 hours. If, however, the average speed

of the whole of the *Jeannette's* drifting be taken, it will be found to be only 1 mile in the 24 hours.

"But are there no other evidences of a current flowing across the North Pole from Bering Sea on the one side to the Atlantic Ocean on the other?

"Yes, there are.

"Dr. Rink received from a Greenlander at Godthaab a remarkable piece of wood which had been found among the drift-timber on the coast. It is one of the 'throwing sticks' which the Eskimo use in hurling their bird-darts, but altogether unlike those used by the Eskimo on the west coast of Greenland. Dr. Rink conjectured that it possibly proceeded from the Eskimo on the east coast of Greenland.

"From later enquiries,* however, it appeared that it must have come from the coast of Alaska in the neighbourhood of Bering Strait, as that is the only place where 'throwing sticks' of a similar form are used. It was even ornamented with Chinese glass beads, exactly similar to those which the Alaskan Eskimo obtain by barter from Asiatic tribes, and use for the decoration of their 'throwing sticks.'

"We may, therefore, with confidence assert that this piece of wood was carried from the west coast of Alaska over to Greenland by a current the whole course of

* See on this point Dr. Y. Nielsen in *Forhandlinger i Videnskabsselskabet i Christiania.* Meeting held June 11th, 1886.

which we do not know, but which may be assumed to flow very near the North Pole, or at some place between it and Franz Josef Land.

"There are, moreover, still further proofs that such a current exists. As is well known, no trees grow in Greenland that can be used for making boats, sledges, or other appliances. The driftwood that is carried down by the polar current along the east coast of Greenland and up the west coast is, therefore, essential to the existence of the Greenland Eskimo. But whence does this timber come?

"Here our enquiries again carry us to lands on the other side of the Pole. I have myself had an opportunity of examining large quantities of driftwood both on the west coast and on the east coast of Greenland. I have, moreover, found pieces drifting in the sea off the east coast, and, like earlier travellers, have arrived at the conclusion that much the greater part of it can only have come from Siberia, while a smaller portion may possibly have come from America. For amongst it are to be found fir, Siberian larch, and other kinds of wood peculiar to the north, which could scarcely have come from any other quarter. Interesting in this respect are the discoveries that have been made on the east coast of Greenland by the second German Polar Expedition. Out of twenty-five pieces of driftwood, seventeen were Siberian larch, five Norwegian fir (probably *picea obovata*), two a kind of alder (*alnus incana?*), and

one a poplar (*populus tremula ?* the common aspen), all of which are trees found in Siberia.

"By way of supplement to these observations on the Greenland side, it may be mentioned that the *Jeannette* Expedition frequently found Siberian driftwood (fir and birch) between the floes in the strong northerly current to the northward of the New Siberian Islands.

"Fortunately for the Eskimo, such large quantities of this driftwood come every year to the coasts of Greenland, that in my opinion one cannot but assume that they are conveyed thither by a constantly-flowing current, especially as the wood never appears to have been very long in the sea, at all events not without having been frozen into the ice.

"That this driftwood passes south of Franz Josef Land and Spitzbergen is quite as unreasonable a theory as that the ice-floe with the relics from the *Jeannette* drifted by this route. In further disproof of this assumption it may be stated that Siberian driftwood is found *north* of Spitzbergen in the strong southerly current, against which Parry fought in vain.

"It appears, therefore, that on these grounds also we cannot but admit the existence of a current flowing across, or in close proximity to, the Pole.

"As an interesting fact in this connection, it may also be mentioned that the German botanist Grisebach has shown that the Greenland flora includes a series of Siberian vegetable forms that could scarcely have

reached Greenland in any other way than by the help of such a current conveying the seeds.

" On the drift-ice in Denmark Strait (between Iceland and Greenland) I have made observations which tend to the conclusion that this ice too was of Siberian origin. For instance, I found quantities of mud on it, which seemed to be of Siberian origin, or might possibly have come from North American rivers. It is possible, however, to maintain that this mud originates in the glacier rivers that flow from under the ice in the north of Greenland, or in other unknown polar lands ; so that this piece of evidence is of less importance than those already named.

" Putting all this together, we seem driven to the conclusion that *a current flows at some point between the Pole and Franz Josef Land from the Siberian Arctic Sea to the east coast of Greenland.*

" That such must be the case we may also infer in another way. If we regard, for instance, the polar current—that broad current which flows down from the unknown polar regions between Spitzbergen and Greenland—and consider what an enormous mass of water it carries along, it must seem self-evident that this cannot come from a circumscribed and small basin, but must needs be gathered from distant sources, the more so as the Polar Sea (so far as we know it) is remarkably shallow everywhere to the north of the European, Asiatic and American coasts. The polar current is no doubt

fed by that branch of the Gulf Stream which makes its way up the west side of Spitzbergen; but this small stream is far from being sufficient, and the main body of its water must be derived from further northwards.

"It is probable that the polar current stretches its suckers, as it were, to the coast of Siberia and Bering Strait, and draws its supplies from these distant regions. The water it carries off is replaced partly through the warm current before mentioned which makes its way through Bering Strait, and partly by that branch of the Gulf Stream which, passing by the north of Norway, bends eastwards towards Novaya Zemlya, and of which a great portion unquestionably continues its course along the north coast of this island into the Siberian Arctic Sea. That a current coming from the south takes this direction, at all events in some measure, appears probable from the well-known fact that in the northern hemisphere the rotation of the earth tends to compel a northward-flowing current, whether of water or of air, to assume an easterly course. The earth's rotation may also cause a southward-flowing stream, like the polar current, to direct its course westward to the east coast of Greenland.

"But even if these currents flowing in the polar basin did not exist, I am still of opinion that in some other way a body of water must collect in it, sufficient to form a polar current. In the first place there are the North European, the Siberian and North American rivers

debouching into the Arctic Sea, to supply this water. The fluvial basin of these rivers is very considerable, comprising a large portion of Northern Europe, almost the whole of Northern Asia or Siberia down to the Altai Mountains and Lake Baikal, together with the principal part of Alaska and British North America. All these added together form no unimportant portion of the earth, and the rainfall of these countries is enormous. It is not conceivable that the Arctic Sea of itself could contribute anything of importance to this rainfall; for, in the first place, it is for the most part covered with drift-ice, from which the evaporation is but trifling; and, in the next place, the comparatively low temperature in these regions prevents any considerable evaporation taking place even from open surfaces of water. The moisture that produces this rainfall must consequently in a great measure come from elsewhere, principally from the Atlantic and Pacific Oceans, and the amount of water which thereby feeds the Arctic Sea, must be very considerable. If we possessed sufficient knowledge of the rainfall in the different localities it might be exactly calculated.*

"The importance of this augmentation appears even

* Since writing the above I have tried to make such a calculation, and have come to the conclusion that the aggregate rainfall is not so large as I had at first supposed. See my paper in *The Norwegian Geographical Society's Annual*, III, 1891–92, p. 95; and *The Geographical Journal*, London, 1893, p. 5.

greater when we consider that the polar basin is comparatively small, and, as has been already remarked, very shallow; its greatest known depth being from 60 to 80 fathoms.

"But there is still another factor that must help to increase the quantity of water in the polar basin, and that is its own rainfall. Weyprecht has already pointed out the probability that the large influx of warm, moist atmosphere, from the south, attracted by the constant low atmospheric pressure in the polar regions, must engender so large a rainfall as to augment considerably the amount of water in the Polar Sea. Moreover, the fact that the polar basin receives large supplies of fresh water is proved by the small amount of salt in the water of the polar current.

"From all these considerations it appears unquestionable that the sea around the Pole is fed with considerable quantities of water, partly fresh, as we have just seen, partly salt, as we indicated further back, proceeding from the different ocean currents. It thus becomes inevitable, according to the law of equilibrium, that these masses of water should seek such an outlet as we find in the Greenland polar current.

"Let us now enquire whether further reasons can be found to show why this current flows exactly in the given direction.

"If we examine the ocean soundings, we at once find a conclusive reason why the main outlet must lie

between Spitzbergen and Greenland. The sea here, so far as we know it, is at all points very deep; there is, indeed, a channel of as much as 2,500 fathoms depth; while south of Spitzbergen and Franz Josef Land it is remarkably shallow, not more than 160 fathoms. As has been stated, a current passes northwards through Bering Strait; and Smith Sound, and the sounds between the islands north of America, though here, indeed, there is a southward current, are far too small and narrow to form adequate outlets for the mass of water of which we are speaking. There is, therefore, no other assumption left than that this mass of water must find its outlet by the route actually followed by the polar current. The channel discovered by the *Jeannette* Expedition between Wrangel Land and the New Siberian Islands may here be mentioned as a notable fact. It extended in a northerly direction, and was at some points more than 80 fathoms deep, while at the sides the soundings ran only to 40 or 50 fathoms. It is by no means impossible that this channel may be a continuation of the channel between Spitzbergen and Greenland,* in which case it would certainly influence, if not actually determine, the direction of the main current.

"If we examine the conditions of wind and atmospheric pressure over the Polar Sea, as far as they

* The discovery during our expedition of a great depth in the polar basin renders it highly probable that this assumption is correct.

are known, it would appear that they must tend to produce a current across the Pole in the direction indicated. From the Atlantic to the south of Spitzbergen and Franz Josef Land a belt of low atmospheric pressure (minimum belt) extends into the Siberian Arctic Sea. In accordance with well-known laws, the wind must have a preponderating direction from west to east on the south side of this belt, and this would promote an eastward-flowing current along the north coast of Siberia, such as has been found to exist there.* The winds on the north side of the minimum belt must, however, blow mainly in a direction from east to west, and will consequently produce a westerly current, passing across the Pole towards the Greenland Sea, exactly as we have seen to be the case.

"It thus appears that, from whatever side we consider this question, even apart from the specially cogent evidences above cited, we cannot escape the conclusion that a current passes across or very near to the Pole into the sea between Greenland and Spitzbergen.

"This being so, it seems to me that the plain thing for us to do is to make our way into the current on that side of the Pole where it flows northward, and by its help to penetrate into those regions which all who have hitherto worked *against* it, have sought in vain to reach.

* The experience of our expedition however does not point to any such eastward-flowing current along the Siberian coast.

"My plan is, briefly, as follows :—I propose to have a ship built, as small and as strong as possible ; just big enough to contain supplies of coals and provisions for twelve men for five years. A ship of about 170 tons (gross) will probably suffice. Its engine should be powerful enough to give a speed of 6 knots ; but in addition it must also be fully rigged for sailing.

"The main point in this vessel is that it be built on such principles as to enable it to withstand the pressure of the ice. The sides must slope sufficiently to prevent the ice, when it presses together, from getting firm hold of the hull, as was the case with the *Jeannette* and other vessels. Instead of nipping the ship, the ice must raise it up out of the water. No very new departure in construction is likely to be needed, for the *Jeannette*, notwithstanding her preposterous build, was able to hold out against the ice pressure for about two years. That a vessel can easily be built on such lines as to fulfil these requirements no one will question, who has seen a ship nipped by the ice. For the same reason, too, the ship ought to be a small one ; for besides being thus easier to manœuvre in the ice, it will be more readily lifted by the pressure of the ice, not to mention that it will be easier to give it the requisite strength. It must, of course, be built of picked materials. A ship of the form and size here indicated will not be a good or comfortable sea-boat, but that is of minor importance in waters filled with ice such as we are here speaking of. It is true that it would

have to travel a long distance over the open sea before it would get so far, but it would not be so bad a sea-boat as to be unable to get along, even though sea-sick passengers might have to offer sacrifices to the gods of the sea.

"With such a ship and a crew of ten, or at the most twelve, able-bodied and carefully picked men, with a full equipment for five years, in every respect as good as modern appliances permit of, I am of opinion that the undertaking would be well secured against risk. With this ship we should sail up through Bering Strait and westward along the north coast of Siberia towards the New Siberian Islands* as early in the summer as the ice would permit.

"Arrived at the New Siberian Islands, it will be advisable to employ the time to the best advantage in examining the conditions of currents and ice, and to wait for the most opportune moment to advance as far as possible in ice-free water, which, judging by the accounts of the ice conditions north of Bering Strait given by American whalers, will probably be in August or the beginning of September.

"When the right time has arrived, then we shall plough our way in amongst the ice as far as we can. We

* I first thought of choosing the route through Bering Strait, because I imagined that I could reach the New Siberian Islands safer and earlier in the year from that side. On further investigation I found that this was doubtful, and I decided on the shorter route through the Kara Sea and north of Cape Chelyuskin.

may venture to conclude from the experience of the *Jeannette* Expedition, that we should thus be able to reach a point north of the most northerly of the New Siberian Islands. De Long notes in his journal that while the expedition was drifting in the ice north of Bennet Island they saw all around them a dark 'water sky'—that is to say, a sky which gives a dark reflection of open water—indicating such a sea as would be, at all events, to some extent navigable by a strong ice-ship. Next, it must be borne in mind that the whole *Jeannette* Expedition travelled in boats, partly in open water, from Bennett Island to the Siberian coast, where, as we know, the majority of them met with a lamentable end. Nordenskiöld advanced no farther northwards than to the southernmost of the islands mentioned (at the end of August) but here he found the water everywhere open.

"It is, therefore, probable that we may be able to push our way up past the New Siberian Islands, and that accomplished we shall be right in the current which carried the *Jeannette*. The thing will then be simply to force our way northwards till we are set fast.*

"Next we must choose a fitting place and moor the ship firmly between suitable ice-floes, and then let the

* As subsequently stated in my lecture in London (*Geographical Society's Journal*, p. 18), I purposed to go north along the west coast of the New Siberian Islands, as I thought that the warm water coming from the Lena would keep the sea open here.

ice screw itself together as much as it likes—the more the better. The ship will simply be hoisted up and will ride safely and firmly. It is possible it may heel over to a certain extent under this pressure; but that will scarcely be of much importance. . . . Henceforth the current will be our motive power, while our ship, no longer a means of transport, will become a barrack, and we shall have ample time for scientific observations.

"In this manner the expedition will, as above indicated, probably drift across the Pole, and onwards to the sea between Greenland and Spitzbergen. And when we get down to the 80th degree of latitude, or even sooner if it is summer, there is every likelihood of our getting the ship free, and being able to sail home. Should she, however, be lost before this—which is certainly possible, though as I think very unlikely if she is constructed in the way above described—the expedition will not, therefore, be a failure, for our homeward course must in any case follow the polar current on to the North Atlantic basin; there is plenty of ice to drift on, and of this means of locomotion we have already had experience. If the *Jeannette* Expedition had had sufficient provisions, and had remained on the ice-floe on which the relics were ultimately found, the result would doubtless have been very different from what it was. Our ship cannot possibly founder under the ice pressure so quickly but that there would be time enough to remove, with all

our equipment and provisions, to a substantial ice-floe, which we should have selected beforehand in view of such a contingency. Here the tents which we should take with us to meet this contingency would be pitched. In order to preserve our provisions and other equipments we should not place them all together on one spot, but should distribute them over the ice, laying them on rafts of planks and beams which we should have built on it. This will obviate the possibility of any of our equipments sinking, even should the floe on which they are break up. The crew of the *Hansa*, who drifted for more than half a year along the east coast of Greenland, in this way lost a great quantity of their supplies.

"For the success of such an expedition two things only are required:—viz., *good clothing*, and *plenty of food*, and these we can take care to have with us. We should thus be able to remain as safely on our ice-floe as in our ship, and should advance just as well towards the Greenland Sea. The only difference would be that on our arrival there, instead of proceeding by ship, we must take to our boats, which would convey us just as safely to the nearest harbour.

"Thus it seems to me there is an overwhelming probability that such an expedition would be successful. Many people, however, will certainly urge:—'In all currents there are eddies and backwaters; suppose, then, you get into one of these, or perhaps stumble on an

unknown land up by the Pole and remain lying fast there, how will you extricate yourselves ?' To this I would merely reply, as concerns the backwater, that we must get out of it just as surely as we got into it, and that we shall have provisions for five years. And as regards the other possibility, we should hail such an occurrence with delight, for no spot on earth could well be found of greater scientific interest. On this newly discovered land we should make as many observations as possible. Should time wear on and find us still unable to get our ship into the set of the current again, there would be nothing for it but to abandon her, and with our boats and necessary stores to search for the nearest current in order to drift in the manner before mentioned.

"How long may we suppose such a voyage to occupy ? As we have already seen, the relics of the *Jeannette* Expedition at most took two years to drift along the same course down to the 80th degree of latitude, where we may, with tolerable certainty, count upon getting loose. This would correspond to a rate of about two miles per day of twenty-four hours.

"We may therefore not unreasonably calculate on reaching this point in the course of two years ; and it is also possible that the ship might be set free in a higher latitude than is here contemplated. Five years' provisions must therefore be regarded as ample.

"But is not the cold in winter in these regions so severe that life will be impossible ? There is no pro-

bability of this. We can even say with tolerable certainty, that at the Pole itself it is not so cold in winter as it is (for example) in the north of Siberia, an inhabited region, or on the northern part of the west coast of Greenland, which is also inhabited. Meteorologists have calculated that the mean temperature at the Pole in January is about — 33° Fahr. (— 36° C.) while, for example, in Yakutsk it is — 43° Fahr. (— 42° C.), and in Verkhoyansk — 54° Fahr. (— 48° C.). We should remember that the Pole is probably covered with sea, radiation from which is considerably less than from large land surfaces, such as the plains of North Asia. The polar region has, therefore, in all probability a marine climate with comparatively mild winters, but, by way of a set-off, with cold summers.

"The cold in these regions cannot, then, be any direct obstacle. One difficulty, however, which many former expeditions have had to contend against, and which must not be overlooked here, is scurvy. During a sojourn of any long duration in so cold a climate, this malady will unquestionably show itself unless one is able to obtain fresh provisions. I think, however, it may be safely assumed that the very various and nutritious foods now available in the form of hermetically closed preparations of different kinds, together with the scientific knowledge we now possess of the food stuffs necessary for bodily health, will enable us to hold this danger at a distance. Nor do I think that there will be an entire absence of fresh provisions in the waters we shall travel through.

Polar bears and seals we may safely calculate on finding far to the north, if not up to the very Pole. It may be mentioned also that the sea must certainly contain quantities of small animals that might serve as food in case of necessity.

"It will be seen that whatever difficulties may be suggested as possible, they are not so great but that they can be surmounted by means of a careful equipment, a fortunate selection of the members of the expedition, and judicious leadership; so that good results may be hoped for. We may reckon on getting out into the sea between Greenland and Spitzbergen as surely as we can reckon on getting into the *Jeannette* current off the New Siberian Islands.

"But if this *Jeannette* current does not pass right across the Pole? If, for instance, it passes between the Pole and Franz Josef Land, as above intimated? What will the expedition do in that case to reach the earth's axis? Yes, this may seem to be the Achilles' heel of the undertaking; for should the ship be carried past the Pole at more than one degree's distance, it may then appear extremely imprudent and unsafe to abandon it in mid-current and face such a long sledge-journey over uneven sea-ice, which itself is drifting. Even if one reached the Pole it would be very uncertain whether one could find the ship again on returning. . . . . I am, however, of opinion that this is of small import:— *it is not to seek for the exact mathematical point that forms*

the northern extremity of the earth's axis that we set out, for to reach this point is intrinsically of small moment. Our object is to investigate the great unknown region that surrounds the Pole, and these investigations will be equally important from a scientific point of view whether the expedition passes over the polar point itself or at some distance from it."

In this lecture I had submitted the most important data on which my plan was founded ; but in the following years I continued to study the conditions of the northern waters, and received ever fresh proofs that my surmise of a drift right across the Polar Sea was correct. In a lecture delivered before the Geographical Society in Christiania, on September 28th, 1892, I alluded to some of these enquiries.* I laid stress on the fact that on considering the thickness and extent of the drift-ice in the seas on both sides of the Pole, one cannot but be struck by the fact that while the ice on the Asiatic side, north of the Siberian coast, is comparatively thin (the ice in which the *Jeannette* drifted was as a rule not more than from 7 to 10 feet thick) that on the other side, which comes drifting from the north in the sea between Greenland and Spitzbergen, is remarkably massive, and this, notwithstanding that the sea north of Siberia is one of the coldest tracts on the earth. This, I suggested, could be explained only on the assumption that the ice is

* See the *Society's Annual*, III, 1892, p. 91.

constantly drifting from the Siberian coast, and that, while passing through the unknown and cold sea there is time for it to attain its enormous thickness partly by freezing, partly by the constant packing that takes place as the floes screw themselves together.

I further mentioned in the same lecture that the mud found on this drift-ice seemed to point to a Siberian origin. I did not at the time attach great importance to this fact, but on a further examination of the deposits I had collected during my Greenland Expedition, it appeared that it could scarcely come from anywhere else but Siberia. On investigating its mineralogical composition, Dr. Törnebohm, of Stockholm, came to the conclusion that the greater part of it must be Siberian river mud. He found about twenty different minerals in it. "This quantity of dissimilar constituent mineral parts appears to me," he says, "to point to the fact that they take their origin from a very extensive tract of land, and one's thoughts naturally turn to Siberia." Moreover, more than half of this mud deposit consisted of humus or boggy soil. More interesting, however, than the actual mud deposit were the diatoms found in it, which were examined by Professor Cleve, of Upsala, who says:—"These diatoms are decidedly marine (*i.e.*, take their origin from salt water), with some few fresh-water forms which the wind has carried from land. The diatomous flora in this dust is quite peculiar and unlike what I have found in many thousands of other speci-

mens, with one exception, with which it shows the most complete conformity, namely, a specimen which was collected by Kellman during the *Vega* Expedition on an ice-floe off Cape Wankarem, near Bering Strait. Species and varieties were perfectly identical in both specimens." Cleve was able to distinguish sixteen species of diatoms. All these appear also in the dust from Cape Wankarem, and twelve of them have been found at that place alone, and nowhere else in all the world. This was a notable coincidence between two such remote points, and Cleve is certainly right in saying :—" It is, indeed, quite remarkable that the diatomous flora on the ice-floes off Bering Strait and on the east coast of Greenland should so completely resemble each other, and should be so utterly unlike all others : it points to an open connection between the seas east of Greenland and north of Asia." "Through this open connection," I continued in my address, "drift-ice is, therefore, yearly transported across the unknown Polar Sea. *On this same drift-ice and by the same route, it must be no less possible to transport an expedition.*"

When this plan was propounded it certainly met with approval in various quarters, especially here at home. Thus it was vigorously supported by Professor Mohn, who, indeed, by his explanation of the drift of the *Jeannette* relics, had given the original impulse to it. But, as might be expected, it met with opposition in the main, especially from abroad, while most of the polar

travellers and Arctic authorities declared, more or less openly, that it was sheer madness. The year before we set out, in November, 1892, I laid it before the Geographical Society in London in a lecture at which the principal Arctic travellers of England were present. After the lecture a discussion took place,* which plainly showed how greatly I was at variance with the generally-accepted opinions as to the conditions in the interior of the Polar Sea, the principles of ice navigation, and the methods that a polar expedition ought to pursue. The eminent Arctic traveller, Admiral Sir Leopold M'Clintock, opened the discussion with the remark :— "I think I may say this is the most adventurous programme ever brought under the notice of the Royal Geographical Society." He allowed that the facts spoke in favour of the correctness of my theories, but was in a high degree doubtful whether my plan could be realised. He was especially of opinion that the danger of being crushed in the ice was too great. A ship could, no doubt, be built that would be strong enough to resist the ice pressure in summer ; but should it be exposed to this pressure in the winter months, when the ice resembled a mountain frozen fast to the ship's side, he thought that the possibility of being forced up on the surface of the ice was very remote. He firmly

* Both my lecture and the discussion are printed in *The Geographical Journal*, London, vol. i, 1893, pp. 1–32.

believed, as did the majority of the others, that there was no probability of ever seeing the *Fram* again, when once she had given herself over to the pitiless polar ice, and concluded by saying, "I wish the doctor full and speedy success. But it will be a great relief to his many friends in England when he returns, and more particularly to those who have had experience of the dangers at all times inseparable from ice navigation, even in regions not quite so far north."

Admiral Sir George Nares said :—

"The adopted Arctic axioms for successfully navigating an icy region are that it is absolutely necessary to keep close to a coast line, and that the farther we advance from civilization, the more desirable it is to insure a reasonably safe line of retreat. Totally disregarding these, the ruling principle of the voyage is that the vessel—on which, if the voyage is in any way successful, the sole future hope of the party will depend, is to be pushed deliberately into the pack-ice. Thus, her commander—in lieu of retaining any power over her future movements—will be forced to submit to be drifted helplessly about in agreement with the natural movements of the ice in which he is imprisoned. Supposing the sea currents are as stated, the time calculated as necessary to drift with the pack across the polar area is several years, during which time, unless new lands are met with, the ice near the vessel will certainly never be quiet, and the ship herself never free from the danger of

being crushed by ice presses. To guard against this the vessel is said to be unusually strong, and of a special form to enable her to rise when the ice presses against her sides. This idea is no novelty whatever; but when once frozen into the polar pack the form of the vessel goes for nothing. She is hermetically sealed to and forms a part of the ice block surrounding her. The form of the ship is for all practical purposes the form of the block of ice in which she is frozen. This is a matter of the first importance, for there is no record of a vessel frozen into the polar pack having been disconnected from the ice, and so rendered capable of rising under pressure as a separate body detached from the ice block, even in the height of summer. In the event of the destruction of the vessel, the boats—necessarily fully stored, not only for the retreat, but for continuing the voyage—are to be available. This is well in theory, but extremely difficult to arrange for in practice. Preparation to abandon the vessel, is the one thing that gives us the most anxiety. To place boats, &c., on the ice packed ready for use involves the danger of being separated from them by a movement of the ice, or of losing them altogether, should a sudden opening occur. If we merely have everything handy for heaving over the side, the emergency may be so sudden that we have not time to save anything. . . ."

As regards the assumed drift of the polar ice, Nares expressed himself on the whole at variance with me.

He insisted that the drift was essentially determined by the prevailing winds :—

"As to the probable direction of the drift, the *Fram*, starting from near the mouth of the Lena River, may expect to meet the main pack not farther north than about latitude 76° 30′. I doubt her getting farther north before she is beset, but taking an extreme case, and giving her 60 miles more, she will then only be in the same latitude as Cape Chelyuskin, 730 miles from the Pole, and about 600 miles from my supposed limit of the effective homeward carrying ocean current. After a close study of all the information we possess, I think the wind will be more likely to drift her towards the west than towards the east. With an ice-encumbered sea north, of her, and more open water or newly-made ice to the southward, the chances are small for a northerly drift, at all events at first, and afterwards I know of no natural forces that will carry the vessel in any reasonable time much farther from the Siberian coast than the *Jeannette* was carried, and during the whole of this time, unless protected by newly discovered lands, she will be to all intents and purposes immovably sealed up in the pack, and exposed to its well-known dangers. There is no doubt that there is an ocean connection across the area proposed to be explored."

In one point, however, Nares was able to declare himself in agreement with me. It was the idea "that the principal aim of all such voyages is to explore the un-

known polar regions, not to reach exactly that mathematical point in which the axis of our globe has its northern termination."*

Sir Allen Young says, among other things: "Dr. Nansen assumes the blank space around the axis of the earth to be a pool of water or ice; I think the great danger to contend with will be the land in nearly every direction near the Pole. Most previous navigators seem to have continued seeing land again and again further and further north. These *Jeannette* relics may have drifted through narrow channels, and thus finally arrived at their destination, and, I think, it would be an extremely dangerous thing for the ship to drift through them, where she might impinge upon the land, and be kept for years."

With regard to the ship's form, Sir Allen Young says: "I do not think the form of the ship is any great point, for, when a ship is fairly nipped, the question is if there is any swell or movement of the ice to lift the ship. If there is no swell the ice must go through her, whatever material she is made of."

One or two authorities, however, expressed themselves in favour of my plan. One was the Arctic traveller, Sir

* After our return home, Admiral Nares, in the most chivalrous fashion, sent me a letter of congratulation, in which he said that the *Fram's* remarkable voyage over the Polar Sea proved that my theory was correct, and his scepticism unfounded.

E. Ingleficld, another Captain (now Admiral) Wharton, Director of the Hydrographic Department of England.

In a letter to the Geographical Society, Admiral Sir George H. Richards says, on the occasion of my address: "I regret to have to speak discouragingly of this project, but I think that any one who can speak with authority ought to speak plainly where so much may be at stake."

With regard to the currents, he says :—"I believe there is a constant outflow (I prefer this word to current) from the north, in consequence of the displacement of the water from the region of the Pole by the ice-cap which covers it, intensified in its density by the enormous weight of snow accumulated on its surface." This outflow takes place on all sides, he thinks, from the polar basin, but should be most pronounced in the tract between the western end of the Parry Islands and Spitzbergen; and with this outflow all previous expeditions have had to contend. He does not appear to make any exception as to the *Tegethoff* or *Jeannette*, and can find no reason "for believing that a current sets north over the Pole from the New Siberian Islands which Dr. Nansen hopes for and believes in." . . . "It is my opinion that when really within what may be called the inner circle, say about 78° of latitude, there is little current of any kind that would influence a ship in the close ice that must be expected; it is when we get outside this circle—round the corners, as it were—into

the straight wide channels, where the ice is loose, that we are really affected by its influence, and here the ice gets naturally thinner, and more decayed in autumn, and less dangerous to a ship. Within the inner circle probably not much of the ice escapes; it becomes older and heavier every year, and in all probability completely blocks the navigation of ships entirely. This is the kind of ice which was brought to Nares' winter quarters at the head of Smith Sound in about 82° 30′ north; and this is the ice which Markham struggled against in his sledge journey, and against which no human power could prevail."

He attached "no real importance" to the *Jeannette* relics. "If found in Greenland, they may well have drifted down on a floe from the neighbourhood of Smith Sound, from some of the American Expeditions which went to Greely's rescue." "It may also well be that some of De Long's printed or written documents in regard to his equipment, may have been taken out by these expeditions, and the same may apply to the other articles." He does not, however, expressly say whether there was any indication of such having been the case.

In a similar letter to the Geographical Society the renowned botanist, Sir Joseph Hooker says:—"Dr. Nansen's project is a wide departure from any hitherto put in practice for the purpose of polar discovery, and it demands the closest scrutiny both on this account, and because it is one involving the greatest peril . . . .

"From my experience of three seasons in the Antarctic regions I do not think that a ship, of whatever build, could long resist destruction if committed to the movements of the pack in the polar regions. One built as strongly as the *Fram* would no doubt resist great pressures in the open pack, but not any pressure or repeated pressures, and still less the thrust of the pack if driven with or by it against land. The lines of the *Fram* might be of service so long as she was on an even keel or in ice of no great height above the water-line; but amongst floes and bergs or when thrown on her beam-ends, they would avail her nothing."

If the *Fram* were to drift towards the Greenland coast or the American polar islands he is of opinion that, supposing a landing could be effected, there would be no probability at all of salvation. Assuming that a landing could be effected, it must be on an inhospitable and probably ice-bound coast, or on the mountainous ice of a palæocrystic sea. With a certainly enfeebled, and probably reduced ship's company, there could, in such a case, be no prospect of reaching succour. Putting aside the possibility of scurvy (against which there is no certain prophylactic), have the depressing influence on the minds of the crew resulting from long confinement in very close quarters during many months of darkness, extreme cold, inaction, ennui, constant peril, and the haunting uncertainty as to the future, been sufficiently taken into account? Perfunctory duties and occupations

do not avert the effects of these conditions; they hardly mitigate them, and have been known to aggravate them. I do not consider the attainment of Dr. Nansen's object by the means at his disposal to be impossible ; but I do consider that the success of such an enterprise would not justify the exposure of valuable lives for its attainment."

In America, General Greely, the leader of the ill-fated expedition generally known by his name (1881–84), wrote an article in *The Forum* (August, 1891) in which he says among other things: — "It strikes me as almost incredible that the plan here advanced by Dr. Nansen should receive encouragement or support. It seems to me to be based on fallacious ideas as to physical conditions within the polar regions, and to foreshadow, if attempted, barren results, apart from the suffering and death among its members. Dr. Nansen, so far as I know, has had no Arctic service ; his crossing of Greenland, however difficult, is no more polar work than the scaling of Mount St. Elias. It is doubtful if any hydrographer would treat seriously his theory of polar currents, or if any Arctic traveller would indorse the whole scheme. There are perhaps a dozen men whose Arctic service has been such that the positive support of this plan by even a respectable minority would entitle it to consideration and confidence. These men are :— Admiral M'Clintock, Richards, Collinson and Nares, and Captain Markham of the Royal Navy, Sir Allen

Young and Leigh-Smith of England, Koldewey of Germany, Payer of Austria, Nordenskiöld of Sweden, and Melville in our own country. I have no hesitation in asserting that no two of these believe in the possibility of Nansen's first proposition—to build a vessel capable of living or navigating in a heavy Arctic pack, into which it is proposed to put his ship. The second proposition is even more hazardous, involving as it does a drift of more than 2,000 miles in a straight line through an unknown region, during which the party in its voyage (lasting two or more years, we are told) would take only boats along, encamp on an iceberg, and live there while floating across."

After this General Greely proceeds to prove the falsity of all my assumptions. Respecting the objects from the *Jeannette*, he says plainly that he does not believe in them. "Probably some drift articles were found," he says, "and it would seem more reasonable to trace them to the *Porteus*, which was wrecked in Smith Sound about 1,000 miles north of Julianehaab." . . . "It is further important to note that, if the articles were really from the *Jeannette*, the nearest route would have been, not across the North Pole along the east coast of Greenland, but down Kennedy Channel and by way of Smith Sound and Baffin Bay, as was suggested as to drift from the *Porteus*."

We could not possibly get near the Pole itself by a long distance, says Greely, as "we know almost as well

as if we had seen it, that there is in the unknown regions an extensive land which is the birthplace of the flat-topped icebergs or the palæocrystic ice." In this glacier-covered land, which he is of opinion must be over 300 miles in diameter, and which sends out icebergs to Greenland as well as to Franz Josef's Land,* the Pole itself must be situated.

"As to the indestructible ship," he says, "it is certainly a most desirable thing for Dr. Nansen." His meaning, however, is that it cannot be built. "Dr. Nansen appears to believe that the question of building on such lines as will give the ship the greatest power of resistance to the pressure of the ice-floe has not been thoroughly and satisfactorily solved, although hundreds of thousands of dollars have been spent for this end by the seal and whaling companies of Scotland and Newfoundland." As an authority he quotes Melville, and says "every Arctic navigator of experience agrees with Melville's dictum, that even if built solid a vessel could not withstand the ice-pressure of the heavy polar pack." To my assertion that the ice along the "Siberian coast is comparatively thin, 7 to 10 feet," he again quotes Melville, who speaks of ice "50 feet high, etc." (something we did not discover, by the way, during the whole of our voyage).

* With reference to his statement that Leigh-Smith had observed such icebergs on the *north-west coast* of Franz Josef's Land, it may be remarked that no human being has ever been there.

After giving still more conclusive proofs that the *Fram* must inevitably go to the bottom, as soon as it should be exposed to the pressure of the ice, he goes on to refer to the impossibility of drifting in the ice with boats. And he concludes his article with the remark that "Arctic exploration is sufficiently credited with rashness and danger in its legitimate and sanctioned methods, without bearing the burden of Dr. Nansen's illogical scheme of self-destruction."

From an article Greely wrote after our return home, in *Harper's Weekly* for September 19th, 1896, he appears to have come to the conclusion that the *Jeannette* relics were genuine and that the assumption of their drift may have been correct, mentioning "Melville, Dall and others" as not believing in them. He allows also that my scheme has been carried out in spite of what he had said. This time he concludes the article as follows:—"In contrasting the expeditions of De Long and Nansen, it is necessary to allude to the single blemish that mars the otherwise magnificent career of Nansen, who deliberately quitted his comrades on the ice-beset ship hundreds of miles from any known land, with the intention of not returning, but, in his own reported words, 'to go to Spitzbergen where he felt certain to find a ship 600 miles away.' De Long and Ambler had such a sense of honour that they sacrificed their lives rather than separate themselves from a dying man whom their presence could not save. It passes

comprehension how Nansen could have thus deviated from the most sacred duty devolving on the commander of a naval expedition. The safe return of brave Captain Sverdrup with the *Fram* does not excuse Nansen. Sverdrup's consistency, courage, and skill in holding fast to the *Fram* and bringing his comrades back to Norway, will win for him in the minds of many laurels even brighter than those of his able and accomplished chief."

One of the few who publicly gave to my plan the support of his scientific authority was Professor Supan, the well-known Editor of *Petermann's Mitteilungen*. In an article in this journal for 1891 (p. 191) he not only spoke warmly in its favour, but supported it with new suggestions. His view was that what he terms the Arctic "wind-shed" probably for the greater part of the year divides the unknown polar basin into two parts. In the eastern part the prevailing winds blow towards the Bering Sea, while those of the western part blow towards the Atlantic. He thought that, as a rule, this "wind-shed" must lie near the Bering Sea, and that the prevailing winds in the tracts we purposed traversing would thus favour our drift. Our experience bore out Professor Supan's theory in a remarkable degree.

CHAPTER II.

Preparations and Equipment.

Foolhardy as the scheme appeared to some, it received powerful support from the Norwegian Government and the King of Norway. A Bill was laid before the Storthing for a grant of £11,250 (200,000 kroner) or two-thirds of the estimated cost. The remaining third I hoped to be able to raise from private sources, as I had already received promises of support from many quarters.

On June 30th, 1890, the amount demanded was voted by the Storthing; which thereby expressed its wish that the expedition should be a Norwegian one. In January, 1891, Mr. Thos. Fearnley, Consul Axel Heiberg, and Mr. Ellef Ringnes set to work to collect the further sum required, and in a few days the amount was subscribed.

His Majesty King Oscar gave £1,125 (20,000 kroner) while private individuals in Norway gave as follows:—

	£	s.	d.
Consul Axel Heiberg	562	10	0
Ditto (later)	393	15	0
Mr. Anton Chr. Houen	1,125	0	0
Mr. A. Dick, Hövik	281	5	0
Ditto (later)	393	15	0
Mr. Thos. Fearnley (merchant)	281	5	0
Ditto (later)	56	5	0
Messrs. Ringnes & Co. (brewers)	281	5	0
Ditto (later)	56	5	0
Mr. A. S. Kjösterud (merchant), Drammen	281	5	0
Ditto (later)	56	5	0
Mr. E. Sundt (merchant), Bergen	281	5	0
Consul Westye Egeberg	562	10	0
Mr. Halver Schou	281	5	0
Baron Harald Wedel Jarlsberg and C. Iövenskiold, Minister of State	562	10	0
Consul Nicolay H. Knudtzon, Christiansund	281	5	0

Among foreign contributors may be mentioned the Royal Geographical Society of London, which showed its sympathy with the undertaking by subscribing £300 sterling. Baron Oscar Dickson provided at his own cost the electric installation (dynamo, accumulators, and conductors).

As the work of equipment proceeded, it appeared that the first estimate was not sufficient. This was especially due to the ship, which was estimated to cost £8,437 10*s.* (150,000 kroner) but which came to nearly double that sum. Where so much was at stake, I did not think it right to study the cost too much, if it seemed that a little extra outlay could ensure the successful result of the

expedition. The three gentlemen who had taken the lead in the first collection, Mr. Thomas Fearnley, Consul Axel Heiberg, and Mr. Ellef Ringnes, undertook at my request to constitute themselves the Committee of the expedition and to take charge of its pecuniary affairs. In order to cover a portion of the deficiency, they, together with certain members of the Council of the Geographical Society, set on foot another private subscription all over the country; while the same society at a later period headed a national subscription. By these means about £956 5*s.* was collected in all. I had further to petition the Norwegian Storthing for an additional sum of £4,500, when our national assembly again gave proof of its sympathy with the undertaking by granting the amount named (June 9th, 1890).

Finally Consul Axel Heiberg and Mr. Dick subscribed an additional £337 10*s.* each, while I myself made up the deficiency that still remained on the eve of our departure.

STATEMENT OF ACCOUNTS OF THE EXPEDITION ON ITS SETTING OUT, 1893.

Income.

	Kroner	ore.
State Grant	280,000	0
H.M. The King, and original private subscribers	105,000	0
Private subscription of the Geographical Society	12,781	23
National subscription	2,287	23
Interest accrued	9,729	78
Guaranteed by private individuals	5,400	0
Deficit covered by A. Heiberg and A. Dick	12,000	0
Ditto F. Nansen	5,400	0
Geographical Society, London (£300)	...	
H. Simon, Manchester (£100)	...	
A Norwegian in Riga (1,000 roubles) and others	9,278	62
Total	444,339	36*

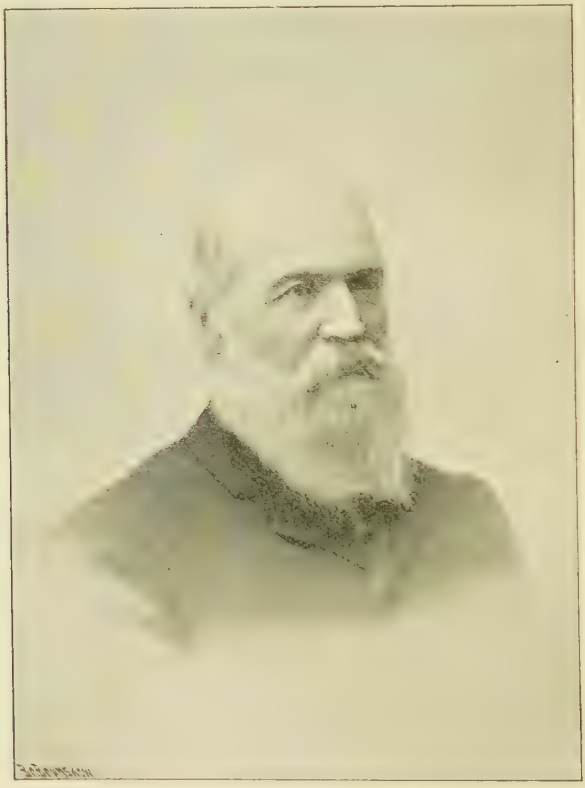
* Nearly £25,000.

Expenditure.

	Kroner	ore.
Wages account	46,440	0
Life insurance premiums of married participators	5,361	90
Instruments account	12,978	68
Ship account	271,927	8
Provisions account	39,172	98
Expenses account	10,612	38
Equipment account	57,846	34
Total	444,339	36

It will be evident from the plan above expounded, that the most important point in the equipment of our expedition was the building of the ship that was to carry

us through the dreaded ice regions. The construction of this vessel was accordingly carried out with greater care, probably, than has been devoted to any ship that



COLIN ARCHER.

has hitherto ploughed the Arctic waters I found in the well-known shipbuilder, Colin Archer, a man who thoroughly understood the task I set him, and who concentrated all his skill, foresight, and rare thorough-

ness upon the work. We must gratefully recognise that the success of the expedition was in no small degree due to this man.

If we turn our attention to the long list of former expeditions and to their equipments, it cannot but strike us that scarcely a single vessel had been built specially for the purpose—in fact, the majority of explorers have not even provided themselves with vessels which were originally intended for ice navigation. This is the more surprising when we remember the sums of money that have been lavished on the equipment of some of these expeditions. The fact is, they have generally been in such a hurry to set out that there has been no time to devote to a more careful equipment. In many cases, indeed, preparations were not begun until a few months before the expedition sailed. The present expedition, however, could not be equipped in so short a time, and if the voyage itself took three years, the preparations took no less time, while the scheme was conceived thrice three years earlier.

Plan after plan did Archer make of the projected ship ; one model after another was prepared and abandoned.

Fresh improvements were constantly being suggested. The form we finally adhered to may seem to many people by no means beautiful ; but that it is well adapted to the ends in view I think our expedition has fully proved. What was especially aimed at was, as mentioned on page 30, to give the ship such sides that it

could readily be hoisted up during ice pressure, without being crushed between the floes. Greely, Nares, etc., etc., are certainly right in saying that this is nothing new. I relied here simply on the sad experiences of earlier expeditions. What, however, may be said to be new is the fact that we not only realised that the ship ought to have such a form, but that we gave it that form, as well as the necessary strength for resisting great ice-pressure, and that this was the guiding idea in the whole work of construction. Colin Archer is quite right in what he says in an article in the *Norsk Tidsskrift for Sövæsen*, 1892 :—"When one bears in mind what is, so to speak, the fundamental idea of Dr. Nansen's plan in his North Pole Expedition . . . . it will readily be seen that a ship which is to be built with exclusive regard to its suitability for this object must differ essentially from any other previously known vessel. . . .

"In the construction of the ship two points must be especially studied, (1) that the shape of the hull be such as to offer as small a vulnerable target as possible to the attacks of the ice; and (2) that it be built so solidly as to be able to withstand the greatest possible pressure from without in any direction whatsoever."

And thus she was built, more attention being paid to making her a safe and warm stronghold while drifting in the ice, than to endowing her with speed or good sailing qualities.

As above stated, our aim was to make the ship as

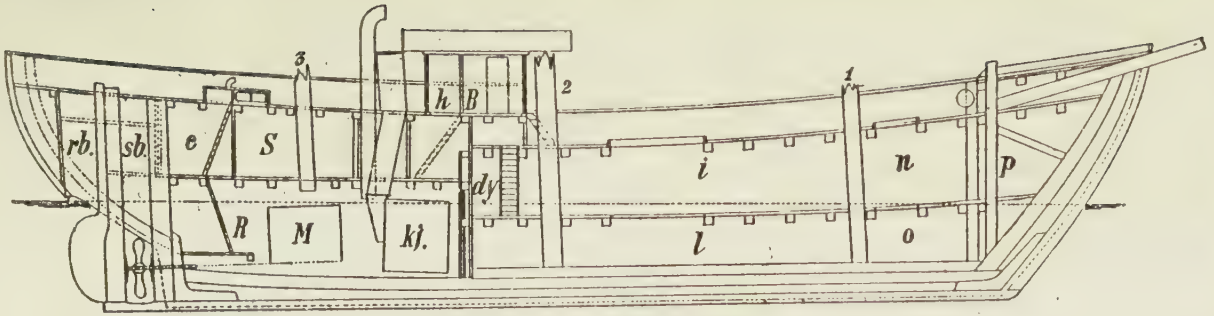


Fig. 1. Longitudinal section.

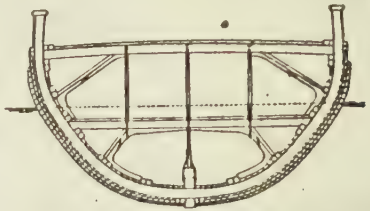


Fig. 3. Transverse section amidships.

Scale.

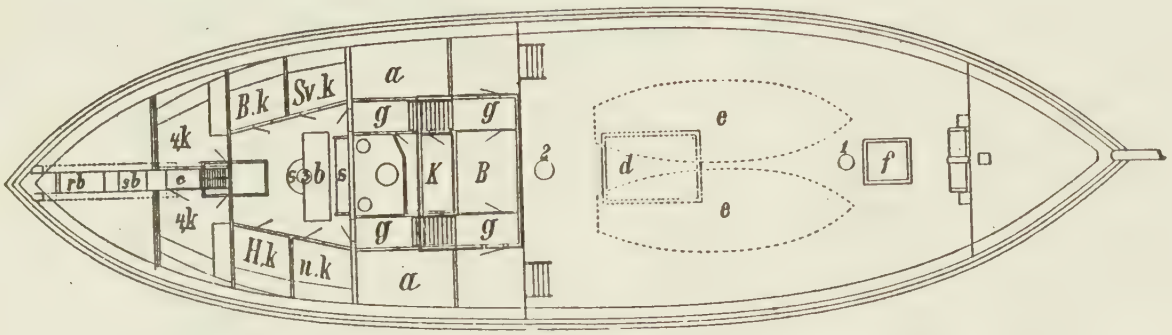


Fig. 2. Plan.

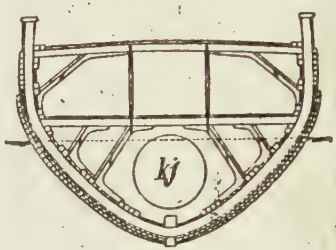


Fig. 4. Transverse section at the engine room.

rb Rudder-well. *sb* Propeller-well. *S* Saloon. *s* Sofas in saloon. *b* Table in saloon. *Svk* Sverdrup's cabin. *Bk* Blessing's cabin. *4k* Four-berth cabins, *Hk* Scott-Hansen's cabin. *nk* Nansen's cabin. *c* Way down to engine-room. *R* Engine-room. *M* Engine. *kj* Boiler. *g* Companions leading from saloon. *K* Cook's galley. *B* Chart-room. *h* Work-room. *dy* Place for the dynamo. *d* Main hatch. *e* Long boats. *i* Main-hold. *l* Under-hold. *f* Fore-hatch. *n* Fore-hold. *o* Under fore-hold. *p* Pawl-bit. *1* Foremast. *2* Mainmast. *3* Mizzenmast.

small as possible. The reason of this was that a small ship is, of course, lighter than a large one, and can be made stronger in proportion to her weight. A small ship too is better adapted for navigation among the ice ; it is easier to handle her in critical moments, and to find a safe berth for her between the packing ice-floes. I was of opinion that a vessel of 170 tons register would suffice, but the *Fram* is considerably larger, 402 tons gross, and 307 tons net. It was also our aim to build a short vessel, which could thread her way easily among the floes, especially as great length would have been a source of weakness when ice-pressure set in. But in order that such a ship, which has, moreover, very sloping sides, shall possess the necessary carrying capacity, she must be broad; and her breadth is in fact about a third of her length. Another point of importance was to make the sides as smooth as possible, without projecting edges, while plane surfaces were as much as possible avoided in the neighbourhood of the most vulnerable points, and the hull assumed a plump and rounded form. Bow, stern, and keel—all were rounded off so that the ice should not be able to get a grip of her anywhere. For this reason, too, the keel was sunk in the planking so that barely three inches protruded and its edges were rounded. The object was that "the whole craft should be able to slip like an eel out of the embraces of the ice."

The hull was made pointed fore and aft, and somewhat resembles a pilot boat, minus the keel and the sharp

garboard strakes. Both ends were made specially strong. The stem consists of three stout oak beams, one inside the other, forming an aggregate thickness of 4 feet (1·25 m.) of solid oak; inside the stem are fitted solid breasthooks of oak and iron to bind the ship's sides together, and from these breasthooks stays are placed against the pawl-bit. The bow is protected by an iron stem, and across it are fitted transverse bars which run some small distance backwards on either side as is usual in sealers.

The stern is of a special and somewhat peculiar construction. On either side of the rudder and propeller posts—which are sided 24 inches (65 cm.)—is fitted a stout oak counter-timber following the curvature of the stern right up to the upper deck, and forming, so to speak, a double stern post. The planking is carried outside these timbers, and the stern protected by heavy iron plates wrought outside the planking.

Between these two counter-timbers there is a well for the screw, and also one for the rudder, through which they can both be hoisted up on deck. It is usual in sealers to have the screw arranged in this way, so that it can easily be replaced by a spare screw should it be broken by the ice. But such an arrangement is not usual in the case of the rudder, and, while with our small crew, and with the help of the capstan, we could hoist the rudder on deck in a few minutes in case of any sudden ice pressure or the like, I have known it take

sealers with a crew of over 60 men several hours, or even a whole day, to ship a fresh rudder.

The stern is, on the whole, the Achilles' heel of ships in the polar seas; here the ice can easily inflict great damage, for instance, by breaking the rudder. To guard against this danger, our rudder was placed so low down as not to be visible above water, so that if a floe should strike the vessel aft, it would break its force against the strong stern-part, and could hardly touch the rudder itself. As a matter of fact, notwithstanding the violent pressures we met with, we never suffered any injury in this respect.

Everything was of course done to make the sides of the ship as strong as possible. The frame timbers were of choice Italian oak that had originally been intended for the Norwegian navy, and had lain under cover at Horten for 30 years. They were all grown to shape and 10–11 inches thick. The frames were built in two courses or tiers, closely wrought together, and connected by bolts, some of which were riveted. Over each joint flat iron bands were placed. The frames were about 21 inches (56 cm.) wide, and were placed close together, with only about an inch or an inch and a-half between; and these interstices were filled with pitch and sawdust mixed, from the keel to a little distance above the water-line, in order to keep the ship moderately watertight, even should the outer skin be chafed through.

The outside planking consists of three layers.

The inner one is of oak 3 inches thick, fastened with spikes and carefully caulked; outside this another oak sheathing 4 inches thick, fastened with through bolts and caulked; and outside these comes the ice-skin of greenheart, which like the other planking runs right down to the keel. At the water-line it is 6 inches thick, gradually diminishing towards the bottom to 3 inches. It is fastened with nails and jagged bolts, and not with through bolts, so that if the ice had stripped off the whole of the ice sheathing the hull of the ship would not have suffered any great damage. The lining inside the frame timbers is of pitch pine planks, some 4 some 8 inches thick; it was also carefully caulked once or twice.

The total thickness of the ship's sides is, therefore, from 24 to 28 inches of solid water-tight wood. It will readily be understood that such a ship's side, with its rounded form, would of itself offer a very good resistance to the ice; but to make it still stronger the inside was shored up in every possible way, so that the hold looks like a cobweb of balks, stanchions, and braces. In the first place, there are two rows of beams, the upper deck and between decks, principally of solid oak, partly also of pitch pine; and all of these are further connected with each other, as well as with the sides of the ship, by numerous supports. The accompanying diagrams will show how they are arranged. The diagonal stays are, of course, placed as nearly as possible at right angles to

the sides of the ship, so as to strengthen them against external pressure and to distribute its force. The vertical stanchions between both tiers of beams and between the lower beams and keelson are admirably adapted for this latter object. All are connected together with strong knees and iron fastenings, so that the whole becomes as it were a single coherent mass. It should be borne in mind that, while in former expeditions it was thought sufficient to give a couple of beams amidships some extra strengthening, every single cross beam in the *Fram* was stayed in the manner described and depicted.

In the engine-room there was, of course, no space for supports in the middle, but in their place two stay ends were fixed on either side. The beams of the lower deck were placed a little under the water-line, where the ice-pressure would be severest. In the after-hold these beams had to be raised a little to give room for the engine. The upper deck aft, therefore, was somewhat higher than the main deck, and the ship had a poop or half-deck, under which were the cabins for all the members of the expedition, and also the cooking-galley. Strong iron riders were worked in for the whole length of the ship in the spaces between the beams, extending in one length from the clamp under the upper deck nearly to the keelson. The keelson was in two tiers and about 31 inches (80 cm.) high, saving in the engine-room where the height of the room only allows

one tier. The keel consists of two heavy American elm logs 14 inches square; but, as has been mentioned, so built in that only 3 inches protrude below the outer planking. The sides of the hull are rounded downwards to the keel, so that a transverse section at the midship frame reminds one forcibly of half a cocoanut cut in two. The higher the ship is lifted out of the water, the heavier does she, of course, become, and the greater her pressure on the ice, but for the above reason the easier also does it become for the ice to lift. To obviate much heeling, in case the hull should be lifted very high, the bottom was made flat, and this proved to be an excellent idea. I endeavoured to determine experimentally the friction of ice against wood, and taking into account the strength of the ship, and the angle of her sides with the surface of the water, I came to the conclusion that her strength must be many times sufficient to withstand the pressure necessary to lift her. This calculation was amply borne out by experience.

The principal dimensions of the ship were as follows:—Length of keel, 102 feet; length of water-line, 113 feet; length from stem to stern on deck, 128 feet; extreme breadth, 36 feet; breadth of water-line, exclusive of ice-skin, 34 feet; depth, 17 feet; draught of water with light cargo, 12½ feet; displacement with light cargo, 530 tons; with heavy cargo, the draught is over 15 feet, and the displacement is 800 tons;

there is a freeboard of about 3 feet 6 inches. The hull with boilers filled was calculated to weigh about 420 tons, and with 800 tons displacement there should, therefore, be spare carrying-power for coal and other cargo to the amount of 380 tons. Thus, in addition to the requisite provisions for dogs and men for more than five years, we could carry coal for four months steaming at full speed, which was more than sufficient for such an expedition as this.

As regards the rigging, the most important object was to have it as simple and as strong as possible, and at the same time so contrived as to offer the least possible resistance to the wind while the ship was under steam. With our small crew it was moreover of the last importance that it should be easy to work from deck. For this reason the *Fram* was rigged as a three-masted fore-and-aft schooner. Several of our old Arctic skippers disapproved of this arrangement. They had always been used to sail with square-rigged ships, and with the conservatism peculiar to their class were of opinion that what they had used was the only thing that could be used in the ice. However, the rig we chose was unquestionably the best for our purpose. In addition to the ordinary fore-and-aft sails we had two movable yards on the foremast for a square foresail and topsail. As the yards were attached to a sliding truss they could easily be hauled down when not in use. The ship's lower masts were tolerably high and massive. The mainmast was

about 80 feet high, the main topmast was 50 feet high, and the crow's-nest on the top was about 102 feet (32 m.) above the water. It was important to have this as high as possible, so as to have a more extended view when it came to picking our way through the ice. The aggregate sail area was about 6,000 sq. feet.

The ship's engine, a triple expansion, was made with particular care. The work was done at the Akers Mechanical Factory, and Engineer Norbeck deserves especial credit for its construction. With his quick insight he foresaw the various possibilities that might occur, and took precautions against them. The triple expansion system was chosen as being the most economical in the consumption of coal; but as it might happen that one or other of the cylinders should get out of order, it was arranged, by means of separate pipes, that any of the cylinders could be cut off, and thus the other two, or, at a pinch, even one alone could be used. In this way the engine, by the mere turning of a cock or two, could be changed at will into a compound high-pressure or low pressure engine. Although nothing ever went wrong with any of the cylinders, this arrangement was frequently used with advantage. By using the engine as a compound one, we could, for instance, give the *Fram* greater speed for a short time, and when occasion demanded we often took this means of forcing our way through the ice. The engine was of 220 indicated horse-power, and we could in calm weather with a light cargo attain a speed of 6 or 7 knots.

The propellers, of which we had two in reserve, were two-bladed, and made of cast-iron ; but we never used either the spare propellers or a spare rudder which we had with us.

Our quarters lay, as before mentioned, abaft under the half-deck, and were arranged so that the saloon, which formed our dining-room and drawing-room, was in the middle, surrounded on all sides by the sleeping-cabins. These consisted of four state-rooms with one berth apiece and two with four berths. The object of this arrangement was to protect the saloon from external cold ; but further, the ceiling, floors and walls were covered with several thick coatings of non-conducting material, the surface layer, in touch with the heat of the cabin, consisting of air-tight linoleum, to prevent the warm, damp air from penetrating to the other side and depositing moisture, which would soon turn to ice. The sides of the ship were lined with tarred felt, then came a space with cork padding, next a deal panelling, then a thick layer of felt, next air-tight linoleum, and last of all an inner panelling. The ceiling of the saloon and cabins consisted of many different layers : air, felt, deal panelling, reindeer hair stuffing, deal panelling, linoleum, air and deal panelling, which, with the 4-inch deck-planks, gave a total thickness of about 15 inches. To form the floor of the saloon, cork padding, 6 or 7 inches thick, was laid on the deck planks, on this a thick wooden floor, and above all linoleum. The skylight which was most

exposed to the cold was protected by three panes of glass one within the other, and in various other ways. One of the greatest difficulties of life on board ship which former Arctic expeditions had had to contend with, was that moisture collecting on the cold outside walls either froze at once or ran down in streams into the berths and on to the floor. Thus it was not unusual to find the mattresses converted into more or less solid masses of ice. We, however, by these arrangements, entirely avoided such an unpleasant state of things, and when the fire was lighted in the saloon there was not a trace of moisture on the walls even in the sleeping cabins. In front of the saloon lay the cook's galley, on either side of which was a companion leading to the deck.

As a protection against the cold, each of these companion-ways was fitted with four small solid doors consisting of several layers of wood with felt between, all of which had to be passed through on going out. And the more completely to exclude the cold air the thresholds of the doors were made more than ordinarily high. On the half-deck over the cook's galley, between the main-mast and the funnel, was a chart-room facing the bow, and a smaller work-room abaft.

In order to secure the safety of the ship in case of a leak, the hold was divided into three compartments by watertight bulkheads. Besides the usual pumps, we had a powerful centrifugal pump driven by the engine, which could be connected with each of the three compartments.

It may be mentioned as an improvement on former expeditions that the *Fram* was furnished with an electric light installation. The dynamo was to be driven by the engine while we were under steam; while the intention was to drive it partly by means of the wind, partly by hand power, during our sojourn in the ice. For this purpose we took a windmill with us, and also a "horsemill" to be worked by ourselves. I had anticipated that this latter might have been useful in giving us exercise in the long polar night. We found, however, that there were plenty of other things to do, and we never used it; on the other hand, the windmill proved extremely serviceable. For illumination when we might not have enough power to produce electric light, we took with us about 16 tons of petroleum, which was also intended for cooking purposes and for warming the cabins. This petroleum, as well as 20 tons of common kerosene* intended to be used along with coal in the boiler, was stored in massive iron tanks, eight of which were in the hold, and one on deck. In all, the ship had eight boats, two of which were especially large,

* This oil, by means of a specially constructed steam-jet apparatus, was injected into the furnaces in the form of a fine spray, where it burned in a very economical and saving manner, giving forth a great amount of heat. The apparatus was one which has been applied to locomotives in England, whence it was procured. It appeared, however, that it tended to overheat the boiler at one particular point, where it made a dent, so that we soon abandoned this method of firing.

29 feet long and 9 feet wide. These were intended for use in case the ship should, after all, be lost, the idea being that we should live in them while drifting in the ice. They were large enough to accommodate the whole ship's company with provisions for many months. Then there were four smaller boats of the form sealers generally use. They were exceedingly strong and lightly built, two of oak, and two of elm. The seventh boat was a small pram, and the eighth a launch with a petroleum engine, which, however, was not very serviceable, and caused us a great deal of trouble.

As I shall have frequent occasion later on to speak of other details of our equipment, I shall content myself here with mentioning a few of the most important.

Special attention was, of course, devoted to our commissariat with a view to obviating the danger of scurvy and other ailments. The principle on which I acted in the choice of provisions was to combine variety with wholesomeness. Every single article of food was chemically analysed before being adopted, and great care was taken that it should be properly packed. Such articles, even, as bread, dried vegetables, etc., etc., were soldered down in tins as a protection against damp.

A good library was of great importance to an expedition like ours, and thanks to publishers and friends both in our own and in other countries we were very well supplied in this respect.

The instruments for taking scientific observations of

course formed an important part of our equipment and special care was bestowed upon them. In addition to the collection of instruments I had used on my Greenland expedition, a great many new ones were provided, and no pains were spared to get them as good and complete as possible. For meteorological observations, in addition to the ordinary thermometers, barometers, aneroids, psychrometers, hygrometers, anemometers, etc., etc., self-registering instruments were also taken. Of special importance were a self-registering aneroid barometer (barograph) and a pair of self-registering thermometers (thermographs). For astronomical observations we had a large theodolite and two smaller ones, intended for use on sledge expeditions, together with several sextants of different sizes. We had, moreover, four ship's chronometers and several pocket chronometers. For magnetic observations, for taking the declination, inclination and intensity (both horizontal and total intensity) we had a complete set of instruments. Among others may be mentioned a spectroscope especially adapted for the northern lights, an electroscope for determining the amount of electricity in the air, photographic apparatuses, of which we had seven, large and small, and a photographometer for making charts. I considered a pendulum apparatus with its adjuncts to be of special importance to enable us to make pendulum experiments in the far north. To do this, however, land was necessary, and, as

we did not find any, this instrument unfortunately did not come into use. For hydrographic observations we took a full equipment of water-samplers, deep water thermometers, etc. To ascertain the saltness of the water, we had, in addition to the ordinary areometers, an electric apparatus specially constructed by Mr. Thornöe. Altogether, our scientific equipment was especially excellent, thanks in great measure to the obliging assistance rendered me by many men of science. I would take this opportunity of tendering my special thanks to Professor Mohn, who, besides seeing to the meteorological instruments, helped me in many other ways with his valuable advice; to Professor Geelmuyden, who undertook the supervision of the astronomical instruments; to Dr. Neumeyer, of Hamburg, who took charge of the magnetic equipment; and to Professor Otto Petterson, of Stockholm, and Mr. Thornöe, of Christiania, both of whom superintended the hydrographic department. Of no less importance were the physiologico-medicinal preparations, to which Professor Torup devoted particular care.

As it might be of the utmost importance in several contingencies to have good sledge-dogs, I applied to my friend, Baron Edward von Toll, of St. Petersburg, and asked him whether it was possible to procure serviceable animals from Siberia.* With great courtesy Von Toll

* I had thought of procuring dogs from the Eskimo of Greenland

replied that he thought he himself could arrange this for me, as he was just on the point of undertaking his second scientific expedition to Siberia and the New Siberian Islands. He proposed to send the dogs to Khabarova, on Yugor Strait. On his journey through Tiumen in January, 1893, by the help of an English merchant named Wardroper, who resided there, he engaged Alexander Ivanovitch Trontheim to undertake the purchase of thirty Ostiak dogs, and their conveyance to Yugor Strait. But Von Toll was not content with this. Mr. Nikolai Kelch having offered to bear the expense, my friend procured the East Siberian dogs, which are acknowledged to be better draught dogs than those of West Siberia (Ostiak dogs), and Johan Torgersen, a Norwegian, undertook to deliver them at the mouth of the Olenek, where it was arranged that we should touch.

Von Toll, moreover, thought it would be important to establish some depôts of provisions on the New Siberian Islands, in case the *Fram* should meet with disaster and the expedition should be obliged to return home that way. On Von Toll's mentioning this, Kelch at once expressed himself willing to bear the costs, as he wished us in that event to meet with Siberian hospitality even on the New Siberian Islands. As it was difficult to find trustworthy agents to carry out a task involving

and Hudson Bay, but there proved to be insuperable difficulties in the way of getting them conveyed from there.

so much responsibility, Von Toll determined to establish the depôts himself, and in May, 1893, he set out on an adventurous and highly interesting journey from the mainland over the ice to the New Siberian Islands, where, besides laying down three depôts for us,* he made some very important geological researches.

Another important matter, I thought, was to have a cargo of coal sent out as far as possible on our route, so that when we broke off all connection with the rest of the world we should have on board the *Fram* as much coal as she could carry. I therefore joyfully accepted an offer from an Englishman, who was to accompany us with his steam yacht to Novaya Zemlya or the Kara Sea, and give us 100 tons of coal on parting company. As our departure was drawing nigh I learnt, however, that other arrangements had been made. It being now too late to take any other measures, I chartered the sloop *Urania*, of Brönösund in Nordland, to bring a cargo of coals to Khabarova on the Yugor Strait.

* These depôts were arranged most carefully and every precaution so well taken that we certainly should not have suffered from famine had we gone there. In the northernmost depôt at Stan Durnova on the west coast of Kotelnoi, at 75° 37′ N.L., we should have found provisions for a week; with these we could easily have made our way 65 miles southwards along the coast to the second depôt at Urassalach, where, in a house built by Baron Von Toll in 1886, we should have found provisions for a whole month. Lastly, a third depôt in a house on the south side of Little Liakhoff Island, with provisions for two months, would have enabled us to reach the mainland with ease.

No sooner did the plan of my expedition become known, than petitions poured in by the hundred from all quarters of the earth, from Europe, America, Australia, from persons who wished to take part in it, in spite of the many warning voices that had been raised. It was no easy thing to choose among all the brave men who applied. As a matter of course it was absolutely essential that every man should be strong and healthy, and not one was finally accepted till he had been carefully examined by Professor Hialmar Heiberg, of Christiania.

The following is a list of the members of the expedition :—

Otto Neumann Sverdrup, Commander of the *Fram* was born in Bindal in Helgeland, 1855. At the age of seventeen he went to sea, passed his mate's examination in 1878, and for some years was captain of a ship. In 1888 89 he took part in the Greenland Expedition. As soon as he heard of the plan of the Polar Expedition he expressed his desire to accompany it, and I knew that I could not place the *Fram* in better hands. He is married and has one child.

Sigurd Scott-Hansen, First Lieutenant in the Navy, undertook the management of the meteorological, astronomical, and magnetic observations. He was born in Christiania in 1868. After passing through the Naval School at Horten, he became an officer in 1889, and First Lieutenant in 1892. He is a son of Andreas Hansen, parish priest in Christiania.

Henrik Greve Blessing, doctor and botanist to the expedition, was born in Drammen in 1866, where his father was at that time a clergyman. He became a student in 1885, and graduated in medicine in the spring of 1893.

Theodore Claudius Jacobsen, mate of the *Fram*, was born at Tromsö in 1855, where his father was a ship's captain, afterwards harbour master and head pilot. At the age of fifteen he went to sea, and passed his mate's examination four years later. He spent two years in New Zealand, and from 1886-90 he went on voyages to the Arctic Sea as skipper of a Tromsö sloop. He is married, and has one child.

Anton Amundsen, chief engineer of the *Fram*, was born at Horten in 1853. In 1884 he passed his technical examination, and soon afterwards his engineer's examination. For twenty-five years he has been in the Navy, where he attained the rank of chief engineer. He is married, and has six children.

Adolf Juell, steward and cook of the *Fram*, was born in the parish of Skåtö, near Kragerö, in 1860. His father, Claus Nielsen, was a farmer and shipowner. In 1879 he passed his mate's examination, and has been captain of a ship many years. He is married, and has four children.

Lars Petterson, second engineer of the *Fram*, was born in 1860, at Borre, near Landskrona, in Sweden, of Norwegian parents. He is a fully qualified smith and

machinist, in which capacity he has served in the Norwegian Navy for several years. Is married and has children.

Frederik Hjalmar Johansen, Lieutenant in the Reserve, was born at Skien in 1867, and matriculated at the University in 1886. In 1891–92 he went to the Military School and became a supernumerary officer. He was so eager to take part in the expedition that, as no other post could be found for him, he accepted that of stoker.

Peter Leonard Henriksen, harpooner, was born in Balsfjord, near Tromsö, in 1859. From childhood he has been a sailor, and from fourteen years old has gone voyages to the Arctic Sea as harpooner and skipper. In 1888 he was shipwrecked off Novaya Zemlya in the sloop *Enigheden*, from Christiansund. He is married and has four children.

Bernhard Nordahl was born in Christiania in 1862. At the age of fourteen he entered the Navy and advanced to be a gunner. Subsequently he has done a little of everything, and among other things has worked as an electrical engineer. He had charge of the dynamo and electric installation on board, acted, moreover, as stoker, and for a time assisted in the meteorological observations. He is married and has five children.

Ivar Otto Irgens Mogstad was born at Aure in Nordmöre in 1856. In 1877 passed his examination as first assistant, and from 1882 onwards was one of the head keepers at the Gaustad Lunatic Asylum.

Bernt Bentzen, born in 1860, went to sea for several years. In 1890 he passed his mate's examination, since which he has sailed as mate in several voyages to the Arctic Sea. We engaged him at Tromsö just as we were starting. It was 8.30 when he came on board to speak to me, and at 10 o'clock the *Fram* set sail.

and a feeling of melancholy seemed to brood over the familiar landscape with all its memories.

It was not until noon next day (June 25th) that the *Fram* glided into the bay by Rækvik, Archer's shipyard, near Laurvik, where her cradle stood, and where many a golden dream had been dreamt of her victorious career. Here we were to take the two long-boats on board and have them set up on their davits; and there were several other things to be shipped. It took the whole day and a good part of the next before all was completed. About three o'clock on the 26th we bade farewell to Rækvik, and made a bend into Laurvik Bay in order to stand out to sea by Frederiksværn. Archer himself had to take the wheel and steer his child this last bit before leaving the ship. And then came the farewell hand-shake; but few words were spoken, and they got into the boat, he, my brothers, and a friend, while the *Fram* glided ahead with her heavy motion, and the bonds that united us were severed. It was sad and strange to see this last relic of home in that little skiff on the wide blue surface, Anker's cutter behind, and Laurvik further in the distance. I almost think a tear glittered on that fine old face as he stood erect in the boat and shouted a farewell to us and to the *Fram*. Do you think he does not love the vessel? That he believes in her I know well. So we gave him the first salute from the *Fram's* guns—a worthier inauguration they could not well have had.

SIGURD SCOTT-HANSEN.

(From a photograph taken in December, 1893.)

Full speed ahead, and in the calm, bright summer weather, while the setting sun shed his beams over the land, the *Fram* stood out towards the blue sea, to get its first roll in the long heaving swell. They stood up in the boat and watched us for long.

We bore along the coast in good weather, past Christiansand. The next evening, June 27th, we were off the Naze. I sat up and chatted with Scott-Hansen till late in the night. He acted as captain on the trip from Christiania to Trondhjem, where Sverdrup was to join, after having accompanied his family to Steenkiær. As we sat there in the chart-house and let the hours slip by while we pushed on in the ever increasing swell, all at once a sea burst open the door and poured in. We rushed out on deck. The ship rolled like a log, the seas broke in over the rails on both sides, and one by one up came all the crew. I feared most lest the slender davits which supported the long-boats should give way, and the boats themselves should go overboard, perhaps carrying away with them a lot of the rigging. Then twenty-five empty paraffin casks which were lashed on deck broke loose, washed backwards and forwards, and gradually filled with water; so that the outlook was not altogether agreeable. But it was worst of all when the piles of reserve timber, spars, and planks, began the same dance, and threatened to break the props under the boats. It was an anxious hour. Sea-sick I stood on the

bridge, occupying myself in alternately making libations to Neptune and trembling for the safety of the boats and the men, who were trying to make snug what they could forward on deck. I often saw only a hotch-potch of sea, drifting planks, arms, legs, and empty barrels. Now a green sea poured over us and knocked a man off his legs so that the water deluged him; now I saw the lads jumping over hurtling spars and barrels, so as not to get their feet crushed between them. There was not a dry thread on them. Juell, who lay asleep in the "Grand Hotel," as we called one of the long-boats, awoke to hear the sea roaring under him like a cataract. I met him at the cabin door as he came running down. It was no longer safe there, he thought; best to save one's rags—he had a bundle under his arm. Then he set off forward to secure his sea-chest, which was floating about on the fore-deck, and dragged it hurriedly aft, while one heavy sea after another swept over him. Once the *Fram* buried her bows and shipped a sea over the forecastle. There was one fellow clinging to the anchor-davits over the frothing water. It was poor Juell again. We were hard put to it to secure our goods and chattels. We had to throw all our good paraffin casks overboard, and one prime timber baulk after another went the same way, while I stood and watched them sadly as they floated off. The rest of the deck cargo was shifted

ADOLF JUELL.

(From a photograph taken in December, 1895.)

aft on to the half-deck. I am afraid the shares in the expedition stood rather low at this moment. Then all at once, when things were about at their worst with us, we sighted a bark looming out of the fog ahead. There it lay with royals and all sails set, as snugly and peacefully as if nothing was the matter, rocking gently on the sea. It made one feel almost savage to look at it. Visions of the Flying Dutchman and other devilry flashed through my mind.

Terrible disaster in the cook's galley! Mogstad goes in and sees the whole wall sprinkled over with dark red stains—rushes off to Nordahl, and says he believes Juell has shot himself through despair at the insufferable heat he complains so about. "Great revolver disaster on board the *Fram!* . . . . ." On close inspection, however, the stains appeared to proceed from a box of chocolate that had upset in the cupboard.

Owing to the fog we dared not go too near land, so kept out to sea, till at last, towards morning, the fog lifted somewhat, and the pilot found his bearings between Farsund and Hummerdus. We put into Lister Fjord, intending to anchor there and get into better sea trim ; but as the weather improved we went on our way. It was not till the afternoon that we steered into Ekersund, owing to thick weather and a stiff breeze, and anchored in Hovland's Bay, where our

pilot, Hovland,* lived. Next morning the boat davits, etc., were put in good working order. The *Fram*, however, was too heavily laden to be at all easy in a seaway; but this we could not alter. What we had we must keep, and if we only got everything on deck shipshape and properly lashed, the sea could not do us much harm however rough it might be; for we knew well enough that ship and rigging would hold out.

It was late in the evening of the last day of June when we rounded Kvarven, and stood in for Bergen in the gloom of the sullen night. Next morning when I came on deck, Vågen lay clear and bright in the sun, all the ships being gaily decked out with bunting from topmast to deck. The sun was holding high festival in the sky—Ulriken, Flöiren and Lövstakken sparkled and glittered, and greeted me as of old. It is a marvellous place, that old Hanseatic town!

In the evening I was to give a lecture, but arrived half an hour too late. For just as I was dressing to go, a number of bills poured in, and if I was to leave the town as a solvent man I must needs pay them, and so the public perforce had to wait. But the worst of it was that the saloon was full of those everlastingly inquisitive

* Both Hovland who piloted us from Christiania to Bergen, and Johan Hågensen who took us from Bergen to Vardö, were most kindly placed at the disposal of the expedition by the Nordenfjeldske Steamship Company of Trondhjem.

tourists. I could hear a whole company of them besieging my cabin door while I was dressing, declaring "they must shake hands with the doctor!"* One of them actually peeped in through the ventilator at me, my secretary told me afterwards. A nice sight she must have seen, the lovely creature! Report says she drew her head back very quickly. Indeed, at every place where we put in we were looked on somewhat as wild animals in a menagerie. For they peeped unceremoniously at us in our berths as if we had been bears and lions in a den, and we could hear them loudly disputing among themselves as to who was who, and whether those nearest and dearest to us whose portraits hung on the walls could be called pretty or not. When I had finished my toilette I opened the door cautiously, made a rush through the gaping company. "There he is, there he is!"† they called to each other as they tumbled up the steps after me. It was no use, I was on the quay and in the carriage long before they had reached the deck.

At 8 o'clock there was a great banquet, many fine speeches, good fare and excellent wine, pretty ladies, music, and dancing till far into the night.

Next morning at 11 o'clock—it was Sunday—in bright sunshiny weather, we stood northwards over

* English in the original. † *Ibid.*

Bergen Fjord, many friends accompanying us. It was a lovely, never-to-be-forgotten summer day. In Herlö Fjord, right out by the skerries, they parted from us, amid wavings of hats and pocket-handkerchiefs ; we could see the little harbour boat for a long while with its black cloud of smoke on the sparkling surface of the water. Outside, the sea rolled in the hazy sunlight ; and within lay the flat Mangerland full of memories for me of zoological investigations in fair weather and foul, years and years ago. Here it was that one of Norway's most famous naturalists, a lonely pastor far removed from the outer world, made his great discoveries. Here I myself first groped my way along the narrow path of zoological research.

It was a wondrous evening. The lingering flush of vanished day suffused the northern sky, while the moon hung large and round over the mountains behind us. Ahead lay Alden and Kinn, like a fairyland rising up from the sea. Tired as I was, I could not seek my berth ; I must drink in all this loveliness in deep refreshing draughts. It was like balm to the soul after all the turmoil and friction with crowds of strangers.

So we went on our way, mostly in fair weather, occasionally in fog and rain, through sounds and between islands, northwards along the coast of Norway. A glorious land—I wonder if another fairway like this is to be found the whole world over ? Those never-to-be-

forgotten mornings, when nature wakens to life, wreaths of mist glittering like silver over the mountains, their tops soaring above the mist like islands out of the sea! Then the day gleaming over the dazzling white snow-peaks! And the evenings, and the sunsets with the pale moon overhead, white mountains and islands lay hushed and dreamlike as a youthful longing! Here and there past homely little havens with houses around them set in smiling green trees.—Ah! those snug homes in the lee of the skerries awake a longing for life and warmth in the breast. You may shrug your shoulders as much as you like at the beauties of nature, but it is a fine thing for a people to have a fair land, be it never so poor. Never did this seem clearer to me than now when I was leaving it.

Every now and then a hurrah from land—at one time from a troop of children, at another from grown-up people, but mostly from wondering peasants who gaze long at the strange-looking ship and muse over its enigmatic destination. And men and women on board sloops and ten-oared boats stand up in their red shirts that glow in the sunlight, and rest on their oars to look at us. Steamboats crowded with people came out from the towns we passed to greet us and bid us God-speed on our way with music, songs, and cannon salutes. The great tourist steamboats dipped flags to us and fired salutes, and the smaller craft did the same. It is embarrassing and oppressive to be the object of homage

like this before anything has been accomplished. There is an old saying :—

"At eve the day shall be praised,
The wife when she is burnt,
The sword when tried,
The woman when married,
The ice when passed over,
Ale when drunk."

Most touching was the interest and sympathy with which these poor fisher-folk and peasants greeted us. It often set me wondering. I felt they followed us with fervent eagerness. I remember one day—it was north in Helgeland—an old woman was standing waving and waving to us on a bare crag. Her cottage lay some distance inland. "I wonder if it can really be us she is waving to," I said to the pilot, who was standing beside me. "You may be sure it is," was the answer. "But how can she know who we are?" "Oh! they know all about the *Fram* up here, in every cabin, and they will be on the look-out for you as you come back, I can tell you," he answered. Ay, truly, it is a responsible task we are undertaking, when the whole nation are with us like this. What if the thing should turn out a huge disappointment!

In the evening I would sit and look around—lonely huts lay scattered here and there on points and islets. Here the Norwegian people wear out their lives in the

struggle with the rocks, in the struggle with the sea; and it is this people that is sending us out into the great hazardous unknown; the very folk who stand there in their fishing-boats and look wonderingly after the *Fram* as she slowly and heavily steams along on her northward course. Many of them wave their sou'-westers and shout "Hurrah!" Others have barely time to gape at us in wonderment. In on the point are a troop of women waving and shouting, outside a few boats with ladies in light summer dresses and gentlemen at the oars entertaining them with small-talk, as they wave their parasols and pocket-handkerchiefs. Yes; it is they who are sending us out. It is not a cheering thought. Not one of them, probably, knows what they are paying their money for. Maybe they have heard it is a glorious enterprise; but why? to what end? Are we not defrauding them? But their eyes are rivetted on the ship, and perhaps there dawns before their minds a momentary vision of a new and inconceivable world, with aspirations after a something of which they know naught. . . . And here on board are men who are leaving wife and children behind them. How sad has been the separation—what longing, what yearning await them in the coming years! And it is not for profit they do it. For honour and glory then? These may be scant enough. It is the same thirst for achievement, the same craving to get beyond the limits of the known which inspired this people in the Saga times, that is

stirring in them again to-day. In spite of all our toil for subsistence, in spite of all our "peasant politics," sheer utilitarianism is perhaps not so dominant among us after all.

As time was precious I did not, as originally intended, put in at Trondhjem, but stopped at Beian, where Sverdrup joined us. Here Professor Brögger also came on board, to accompany us as far as Tromsö.

Here, too, our doctor received three monstrous chests with the medicine supply, a gift from Apothecary Brunn of Trondhjem.

And so on towards the north along the lovely coast of Nordland. We stopped at one or two places to take dried fish on board as provision for the dogs. Past Torghatten, the Seven Sisters, and Hestemanden, past Lovunen and Trænen, far out yonder in the sea, past Lofoten and all the other lovely places—each bold gigantic form wilder and more beautiful than the last. It is unique—a fairyland—a land of dreams. We felt afraid to go on too fast—for fear of missing something.

On July 12th we arrived at Tromsö, where we were to take in coal and other things, such as reindeer cloaks "komager" (a sort of Lapp mocassin), Finn shoes, "senne" grass, dried reindeer flesh, etc., etc., all of which had been procured by that indefatigable friend of the expedition, Advocate Mack. Tromsö gave us a cold reception—a north-westerly gale, with driving snow and

OTTO SVERDRUP.

(From a photograph taken in 1895.)

sleet. Mountains, plains, and house-roofs were all covered with snow down to the water's edge. It was the very bitterest July day I ever experienced. The people there said they could not remember such a July. Perhaps they were afraid the place would come into disrepute, for in a town where they hold snow-shoe races on Midsummer Day one may be prepared for anything in the way of weather.

In Tromsö the next day a new member of the expedition was engaged, Bernt Bentzen—a stout fellow to look at. He originally intended accompanying us only as far as Yugor Strait, but as a matter of fact he went the whole voyage with us, and proved a great acquisition, being not only a capital seaman, but a cheerful and amusing comrade.

After a stay of two days we again set out. On the night of the 16th, east of the North Cape or Magerö, we met with such a nasty sea, and shipped so much water on deck, that we put into Kjöllefjord to adjust our cargo better by shifting the coal and making a few other changes. We worked at this the whole of two days, and made everything clear for the voyage to Novaya Zemlya. I had at first thought of taking on board a fresh supply of coal at Vardö, but as we were already deeply laden, and the *Urania* was to meet us at Yugor Strait with coal, we thought it best to be contented with what we had already got on board, as we might expect bad weather in crossing the White Sea

and Barents Sea. At ten o'clock in the evening we weighed anchor and reached Vardö next evening, where we met with a magnificent reception. There was a band of music on the pier, the fjord teemed with boats, flags waved on every hand, and salutes were fired. The people had been waiting for us ever since the previous evening, we were told—some of them, indeed, coming from Vadsö—and they had seized the opportunity to get up a subscription to provide a big drum for the town band, the "North Pole." And here we were entertained to a sumptuous banquet, with speeches and champagne flowing in streams, ere we bade Norway our last farewell.

The last thing that had now to be done for the *Fram* was to have her bottom cleaned of mussels and weeds, so that she might be able to make the best speed possible. This work was done by divers, who were readily placed at our service by the local inspector of the Government Harbour Department.

But our own bodies also claimed one last civilised feast of purification, before entering on a life of savagery. The bath-house of the town is a small timber building. The bath-room itself is low, and provided with shelves where you lie down and are parboiled with hot steam, which is constantly kept up by water being thrown on the glowing hot stones of an awful oven, worthy of hell itself; while all the time young Quæn (lasses) flog you with birch twigs. After that you are rubbed down,

washed and dried delightfully—everything being well-managed, clean and comfortable. I wonder whether old father Mahomet has set up a bath like this in his paradise.

CHAPTER IV.

Farewell to Norway.

I felt in a strange mood as I sat up the last night writing letters and telegrams. We had bidden farewell to our excellent pilot, Johan Hågensen, who had piloted us from Bergen, and now we were only the thirteen members of the expedition, together with my secretary, Christofersen, who had accompanied us so far, and was to go on with us as far as Yugor Strait. Everything was so calm and still, save for the scraping of the pen that was sending off a farewell to friends at home.

All the men were asleep below.

The last telegram was written, and I sent my secretary ashore with it. It was 3 o'clock in the morning when he returned, and I called Sverdrup up and one or two others. We weighed anchor, and stood out of the harbour in the silence of the morning. The town still lay wrapped in sleep, everything looked so peaceful and lovely all around, with the exception of a little stir of awakening toil on board one single steamer in the harbour. A sleepy fisherman stuck his head up out of

the half-deck of his ten-oared boat, and stared at us as we steamed past the breakwater; and on the revenue cutter outside there was a man fishing in that early morning light.

This last impression of Norway was just the right one for us to carry away with us. Such beneficent peace and calm; such a rest for the thoughts; no hubbub and turmoil of people with their hurrahs and salutes. The masts in the harbour, the house roofs and chimneys stood out against the cool morning sky. Just then the sun broke through the mist, and smiled over the shore—rugged, bare, and weatherworn in the hazy morning, but still lovely—dotted here and there with tiny houses and boats, and all Norway lay behind it. . . .

While the *Fram* was slowly and quietly working her way out to sea, towards our distant goal, I stood and watched the land gradually fading away on the horizon. I wonder what will happen to her and to us, before we again see Norway rising up over the sea?

But a fog soon came on, and obscured everything.

And through fog, nothing but fog, we steamed away for four days without stopping, until, when I came on deck on the morning of the 25th of July, behold clear weather! The sun was shining in a cloudless sky, the bright blue sea was heaving with a gentle swell. Again it was good to be a living being, and to drink in the peacefulness of the sea in long draughts. Towards noon we sighted Goose Land on Novaya Zemlya, and stood in

towards it. Guns and cartridges were got ready, and we looked forward with joyful anticipation to roast goose and other game; but we had gone but a short distance when the grey woolly fog from the south-east came up and enveloped us. Again we were shut off from the world around us. It was scarcely prudent to make for land, so we set our course eastwards towards Yugor Strait; but a head wind soon compelled us to beat up under steam and sail, which we went on doing for a couple of days, plunged in a world of fog. Ugh! that endless, stubborn fog of the Arctic Sea! When it lowers its curtain, and shuts out the blue above and the blue below, and everything becomes a damp grey mist, day in and day out, then all the vigour and elasticity of the soul is needed to save one from being stifled in its clammy embrace. Fog, and nothing but fog, wherever we turn our eyes. It condenses on the rigging, and drips down on every tiniest spot on deck. It lodges on your clothes, and finally wets you through and through. It settles down on the mind and spirits, and everything becomes one uniform grey.

On the evening of July 27th, while still fogbound, we quite unexpectedly met with ice; a mere strip, indeed, which we easily passed through, but it boded ill. In the night we met with more—a broader strip this time, which also we passed through. But next morning I was called up with the information that there was thick, old ice ahead. Well, if ice difficulties were to begin so soon,

FIRST DRIFT ICE. 28 JULY, 1893.

(*By Otto Sinding.*)

it would be a bad look out indeed. Such are the chill surprises that the Arctic Sea has more than enough of. I dressed and was up in the crow's-nest in a twinkling. The ice lay extended everywhere, as far as the eye could reach through the fog, which had lifted a little. There was no small quantity of ice, but it was tolerably open, and there was nothing for it but to be true to our watch-word and "gå fram"—push onwards. For a good while we picked our way. But now it began to lie closer with large floes every here and there, and at the same time the fog grew denser, and we could not see our way at all. To go ahead in difficult ice and in a fog is not very prudent, for it is impossible to tell just where you are going, and you are apt to be set fast before you know where you are. So we had to stop and wait. But still the fog grew ever denser, while the ice did the same. Our hopes meanwhile rose and fell, but mostly the latter I think. To encounter so much ice already in these waters, where at this time of year the sea is, as a rule, quite free from it, boded anything but good. Already at Tromsö and Vardö we had heard bad news; the White Sea, they said, had only been clear of ice a very short time, and a boat that had tried to reach Yugor Strait had had to turn back because of the ice. Neither were our anticipations of the Kara Sea altogether cheerful. What might we not expect there? For the *Urania* with our coal, too, this ice was a bad business; for it would be unable to make its way

through unless it had found navigable water further south along the Russian coast.

Just as our prospects were at their darkest, and we were preparing to seek a way back out of the ice which kept getting ever denser, the joyful tidings came that the fog was lifting, and that clear water was visible ahead to the east on the other side of the ice. After forcing our way ahead for some hours between the heavy floes, we were once more in open water. This first bout with the ice, however, showed us plainly what an excellent ice-boat the *Fram* was. It was a royal pleasure to work her ahead through difficult ice. She twisted and turned "like a ball on a platter." No channel between the floes so winding and awkward but she could get through it. But it is hard work for the helmsman. "Hard a-starboard! Hard a-port! Steady! Hard a-starboard again!" goes on incessantly without so much as a breathing-space. And he rattles the wheel round, the sweat pours off him, and round it goes again like a spinning-wheel. And the ship swings round, and wriggles her way forward among the floes without touching, if there is only just an opening wide enough for her to slip through; and where there is none she drives full tilt at the ice, with her heavy plunge, runs her sloping bows up on it, treads it under her and bursts the floes asunder. And how strong she is too! Even when she goes full speed at a floe, not a creak, not a sound is to

be heard in her; if she gives a little shake it is all she does.

On Saturday, July 29th, we again headed eastwards towards Yugor Strait as fast as sails and steam could take us. We had open sea ahead, the weather was fine and the wind fair. Next morning we came under the south side of Dolgoi or Langöia, as the Norwegian whalers call it, where we had to stand to the northward. On reaching the north of the island we again bore eastwards. Here I descried from the crow's-nest, as far as I could make out, several islands which are not given on the charts. They lay a little to the east of Langöia.

It was now pretty clear that the *Urania* had not made her way through the ice. While we were sitting in the saloon in the forenoon talking about it, a cry was heard from deck that the sloop was in sight. It was joyful news, but the joy was of no long duration. The next moment we heard she had a crow's-nest on her mast, so she was doubtless a sealer. When she sighted us, she bore off to the south, probably fearing that we were a Russian war-ship or something equally bad. So, as we had no particular interest in her, we let her go on her way in peace.

Later in the day we neared Yugor Strait. We kept a sharp look-out for land ahead, but none could be seen. Hour after hour passed as we glided onwards at good speed, but still no land. Certainly it would not

be high land, but nevertheless this was strange. Yes—there it lies like a low shadow over the horizon on the port bow. It is land—it is Vaigats Island. Soon we sight more of it—abaft the beam, then too the mainland on the south side of the strait. More and more of it comes in sight—it increases rapidly. All low and level land, no heights, no variety, no apparent opening for the strait ahead. Thence it stretches away to the north and south in a soft low curve. This is the threshold of Asia's boundless plains, so different from all we have been used to.

We now glided into the strait with its low rocky shores on either side. The strata of the rocks lie endways, and are crumpled and broken, but on the surface everything is level and smooth. No one who travels over the flat green plains and tundras would have any idea of the mysteries and upheavals that lie hidden beneath the sward. Here once upon a time were mountains and valleys, now all worn away and washed out.

We looked out for Khabarova. On the north side of the sound there was a mark; a shipwrecked sloop lay on the shore, it was a Norwegian sealer. The wreck of a smaller vessel lay by its side. On the south side was a flag-staff, and on it a red flag; Khabarova must then lie behind it. At last one or two buildings or shanties appeared behind a promontory, and soon the whole place lay exposed to view, consisting of tents and a few houses.

On a little jutting-out point close by us was a large red building, with white door frames, of a very homelike appearance. It was indeed a Norwegian warehouse which Sibiriakoff had imported from Finmarken. But here the water was shallow, and we had to proceed carefully for fear of running aground. We kept heaving the lead incessantly—we had 5 fathoms of water, and then 4, then not much more than we needed, and then it shelved to a little over 3 fathoms. This was rather too close work, so we stood out again a bit to wait till we got a little nearer the place before drawing in to the shore.

A boat was now seen slowly approaching from the land. A man of middle height, with an open kindly face and reddish beard, came on board. He might have been a Norwegian from his appearance. I went to meet him, and asked him in German if he was Trontheim. Yes, he was. After him there came a number of strange figures clad in heavy robes of reindeer skin, which nearly touched the deck. On their heads they wore peculiar "baschlik"-like caps of reincalf skin, beneath which strongly-marked bearded faces showed forth, such as might well have belonged to old Norwegian Vikings. The whole scene, indeed, called up in my mind a picture of the Viking Age, of expeditions to Gardarike and Bjarmeland. They were fine stalwart-looking fellows, these Russian traders, who barter with the natives, giving them brandy in exchange for bearskins, sealskins, and other valuables,

and who, when once they have a hold on a man, keep him in such a state of dependence that he can scarcely call his soul his own. "Es ist eine alte Geschichte, doch wird sie immer neu." Soon, too, the Samoyedes came flocking on board, pleasant-featured people of the broad Asiatic type. Of course it was only the men who came.

The first question I asked Trontheim was about the ice. He replied that Yugor Strait had been open a long while, and that he had been expecting our arrival every day since then with ever-increasing anxiety. The natives and the Russians had begun to jeer at him as time went on, and no *Fram* was to be seen; but now he had his revenge and was all sunshine. He thought the state of the ice in the Kara Sea would be favourable; some Samoyedes had said so, who had been seal hunting near the eastern entrance of the Strait a day or two previously. This was not very much to build upon, certainly, but still sufficient to make us regret that we had not got there before. Then we spoke of the *Urania*, of which no one, of course, had seen anything. No ship had put in there for some time, except the sealing sloop we had passed in the morning.

Next we enquired about the dogs and learned that everything was all right with them. To make sure, Trontheim had purchased forty dogs, though I had only asked for thirty. Five of these, from various mishaps, had died during their journey—one had been bitten to

death, two had got home lost and had been strangled while passing through a forest, etc., etc. One, moreover, had been taken ill a few days before, and was still on the sick list; but the remaining thirty-four were in good condition; we could hear them howling and barking. During this conversation we had come as near to Khabarova as we dared venture, and at seven in the evening cast anchor in about 3 fathoms of water.

Over the supper table Trontheim told us his adventures. On the way from Sopva and Ural to the Pechora he heard that there was a dog epidemic in that locality: consequently he did not think it advisable to go to the Pechora as he had intended, but laid his course instead direct from Ural to Yugor Strait. Towards the end of the journey the snow had disappeared, and, in company with a reindeer caravan, he drove on with his dogs over the bare plain, stocks and stones and all, using the sledges none the less. The Samoyedes and natives of Northern Siberia have no vehicles but sledges. The summer sledge is somewhat higher than the winter sledge, in order that it may not hang fast upon stones and stumps. As may be supposed, however, summer sledging is anything but smooth work.

After supper we went ashore, and were soon on the flat beach of Khabarova, the Russians and Samoyedes regarding us with the utmost curiosity. The first objects to attract our attention were the two churches—an old venerable-looking wooden shed of an oblong

rectangular form, and an octagonal pavilion, not unlike many summer-houses or garden pavilions that I have seen at home. How far the divergence between the two forms of religion was indicated in the two mathematical

THE NEW CHURCH AND THE OLD CHURCH AT KHABAROVA.
(*From a Photograph.*)

figures I am unable to say. It might be that the simplicity of the old faith was expressed in the simple, four-sided building, while the rites and ceremonies of the other were typified in the octagonal form, with its double number of corners to stumble against. Then we

must go and see the monastery—"Skit," as it was called —where the six monks had lived, or rather, died, from what people said was scurvy, probably helped out by alcohol. It lay over against the new church, and resembled an ordinary low Russian timber house. The priest and his assistants were living there now, and had asked Trontheim to take up his quarters with them. Trontheim, therefore, invited us in, and we soon found ourselves in a couple of comfortable log-built rooms with open fire-places like our Norwegian "peis."

After this we proceeded to the dog-camp, which was situated on a plain at some distance from the houses and tents. As we approached it the howling and barking kept getting worse and worse. When a short distance off, we were surprised to see a Norwegian flag on the top of a pole. Trontheim's face beamed with joy as our eyes fell on it. It was, he said, under the same flag as our expedition that his had been undertaken. There stood the dogs tied up, making a deafening clamour. Many of them appeared to be well-bred animals—long-haired, snow-white, with up-standing ears and pointed muzzles. With their gentle, good-natured looking faces they at once ingratiated themselves in our affections. Some of them more resembled a fox, and had shorter coats, while others were black or spotted. Evidently they were of different races, and some of them betrayed by their drooping ears a strong admixture of European blood. After having duly admired the ravenous

way in which they swallowed raw fish (gwiniad), not without a good deal of snarling and wrangling, we took a walk inland to a lake close by, in search of game; but we only found an Arctic gull with its brood. A channel had been dug from this lake to convey drinking water to Khabarova. According to what Trontheim told us, this was the work of the monks—about the only work, probably, they had ever taken in hand. The soil here was a soft clay, and the channel was narrow and shallow, like a roadside ditch or gutter; the work could not have been very arduous. On the hill above the lake stood the flagstaff which we had noticed on our arrival. It had been erected by the excellent Trontheim to bid us welcome, and on the flag itself, as I afterwards discovered by chance, was the word "Vorwärts." Trontheim had been told that was the name of our ship, so he was not a little disappointed when he came on board to find it was *Fram* instead. I consoled him, however, by telling him they both meant the same thing, and that his welcome was just as well meant, whether written in German or Norwegian. Trontheim told me afterwards that he was by descent a Norwegian, his father having been a ship's captain from Trondhjem, and his mother, an Esthonian, settled at Riga. His father had been much at sea, and had died early, so the son had not learnt Norwegian.

Naturally our first and foremost object was to learn all we could about the ice in the Arctic Sea. We had determined to push on as soon as possible; but we must

PETER HENRIKSEN.

(From a photograph taken in 1895.)

have the boiler put in order first, while sundry pipes and valves in the engine wanted seeing to. As it would take several days to do this, Sverdrup, Peter Henriksen, and I set out next morning in our little petroleum launch to the eastern opening of the Yugor Strait, to see with our own eyes what might be the condition of the ice to the eastward. It was 28 miles thither. A quantity of ice was drifting through the strait from the east, and, as there was a northerly breeze, we at once turned our course northwards to get under the lee of the north shore where the water was more open. I had the rather thankless task of acting as helmsman and engineer at one and the same time. The boat went on like a little hero and made about six knots. Everything looked bright. But alas! good fortune seldom lasts long, especially when one has to do with petroleum launches. A defect in the circulation pump soon stopped the engine, and we could only go for short distances at a time, till we reached the north shore, where, after two hours' hard work, I got the engines so far in order as to be able to continue our journey to the north-east through the sound between the drifting floes. We got on pretty well, except for an interruption every now and then when the engine took it into its head to come to a standstill. It caused a good deal of merriment when the stalwart Peter turned the crank to set her off again, and the engine gave a start, so as nearly to pull his arms out of joint, and upset him head over heels in the boat. Every now

and then a flock of long-tailed duck (*Harelda glacialis*) or other birds came whizzing by us, one or two of them invariably falling to our guns.

We had kept along the Vaigats shore, but now crossed over towards the south side of the strait. When about the middle of the channel I was startled by all at once seeing the bottom grow light under us, and had nearly run the boat on a shoal of which no one knew anything. There was scarcely more than 2 or 3 feet of water, and the current ran over it like a rapid river. Shoals and sunken rocks abound there on every hand, especially on the south side of the strait, and it required great care to navigate a vessel through it. Near the eastern mouth of the strait we put into a little creek, dragged the boat up on the beach, and then taking our guns made for some high-lying land we had noticed. We tramped along over the same undulating plain-land with low ridges as we had seen everywhere round the Yugor Strait. A brownish-green carpet of moss and grass spread over the plain, bestrewn with flowers of rare beauty. During the long, cold Siberian winter the snow lies in a thick mass over the tundra; but no sooner does the sun get the better of it than hosts of tiny northern flowers burst their way up through the last disappearing coating of snow, and open their modest calices, blushing in the radiant summer day that bathes the plain in its splendour. Saxifrages with large blooms, pale yellow mountain poppies (*papaver nudicaule*) stand in bright

clusters, and here and there with bluish forget-me-nots and white cloud-berry flowers ; in some boggy hollows the cotton-grass spreads its wavy down carpet, while in other spots small forests of blue-bells softly tingle in the wind on their upright stalks. These flowers are not at all brilliant specimens, being in most cases not more than a couple of inches high, but they are all the more exquisite on that account, and in such surroundings their beauty is singularly attractive. While the eye vainly seeks for a resting place over the boundless plain, these modest blooms smile at you, and take the fancy captive.

And over these mighty tundra-plains of Asia, stretching infinitely onwards from one sky-line to the other, the nomad wanders with his reindeer-herds, a glorious, free life! Where he wills he pitches his tent, his reindeer around him ; and at his will again he goes on his way. I almost envied him. He has no goal to struggle towards, no anxieties to endure—he has merely to live! I well-nigh wished that I could live his peaceful life, with wife and child, on these boundless, open plains, unfettered, happy.

After we had proceeded a short distance, we became aware of a white object sitting on a stone heap beneath a little ridge, and soon noticed more in other directions. They looked quite ghostly as they sat there silent and motionless. With the help of my field-glass I discovered that they were snow-owls. We set out after

them, but they took care to keep out of the range of a fowling-piece. Sverdrup, however, shot one or two with his rifle. There was a great number of them ; I could count as many as eight or ten at once. They sat motionless on tussocks of grass or stones, watching, no doubt, for lemmings, of which, judging from their tracks, there must have been quantities. We, however, did not see any.

From the tops of the ridges we could see over the Kara Sea to the north-east. Everywhere ice could be descried through the telescope, far on the horizon—ice, too, that seemed tolerably close and massive. But between it and the coast there was open water, stretching like a wide channel, as far as the eye could reach, to the south-east. This was all we could make out, but it was in reality all we wanted. There seemed to be no doubt that we could make our way forward, and, well satisfied, we returned to our boat. Here we lighted a fire of driftwood, and made some glorious coffee.

As the coffee-kettle was singing over a splendid fire, and we stretched ourselves at full length on the slope by its side and smoked a quiet pipe, Sverdrup made himself thoroughly comfortable, and told us one story after another. However gloomy a country might look, however desolate, if only there were plenty of driftwood on the beach, so that one could make a right good fire, the bigger the better, then his eyes would glisten with delight—that land was his El Dorado. So from that

time forth he conceived a high opinion of the Siberian coast—a right good place for wintering, he called it.

On our way back we ran at full speed on to a sunken rock. After a bump or two, the boat slid over it; but just as she was slipping off on the other side, the propeller struck on the rock, so that the stern gave a bound into the air while the engine whizzed round at a tearing rate. It all happened in a second, before I had time to stop her. Unluckily one screw blade was broken off, but we drove ahead with the other as best we could. Our progress was certainly rather uneven, but for all that we managed to get on somehow.

Towards morning we drew near the *Fram*, passing two Samoyedes who had drawn their boat up on an ice-floe and were looking out for seals. I wonder what they thought when they saw our tiny boat shoot by them without steam, sails or oars. We, at all events, looked down on these "poor savages" with the self-satisfied compassion of Europeans, as, comfortably seated, we dashed past them.

But pride comes before a fall! We had not gone far when—whirr, whirr, whirr—a fearful racket! bits of broken steel springs whizzed past my ears, and the whole machine came to a dead stop. It was not to be moved either forwards or backwards. The vibration of the one-bladed propeller had brought the lead line little by little within the range of the flywheel, and all at once the whole line was drawn into the machinery, and got so

dreadfully entangled in it that we had to take the whole thing to pieces to get it clear once more. So we had to endure the humiliation of rowing back to our proud ship, for whose fleshpots we had long been an-hungered.

The nett result of the day was: tolerably good news about the Kara Sea; forty birds, principally geese and long-tailed ducks; one seal; and a disabled boat. Amundsen and I, however, soon put this in complete repair again—but in so doing I fear I forfeited for ever and a day the esteem of the Russians and Samoyedes in these parts. Some of them had been on board in the morning and seen me hard at work in the boat in my shirt sleeves, face and bare arms dirty with oil and other messes. They went on shore afterwards to Trontheim, and said that I could not possibly be a great person, slaving away like any other workman on board, and looking worse than a common rough. Trontheim, unfortunately, knew of nothing that could be said in my excuse; there is no fighting against facts.

In the evening some of us went on shore to try the dogs. Trontheim picked out ten of them, and harnessed them to a Samoyede sledge. No sooner were we ready and I had taken my seat, than the team caught sight of a wretched strange dog that had come near, and off dashed dogs, sledge, and my valuable person after the poor creature. There was a tremendous uproar; all the ten tumbled over each other like wild wolves, biting and tearing wherever they could catch hold; blood ran in

streams, and the culprit howled pitiably, while Trontheim tore round like a madman, striking right and left with his long switch. Samoyedes and Russians came screaming from all sides. I sat passively on the sledge in the middle of it all, dumb with fright, and it was ever so long before it occurred to me that there was perhaps something for me too to do. With a horrible yell I flung myself on some of the worst fighters, got hold of them by the neck, and managed to give the culprit time to get away.

OUR TRIAL TRIP WITH THE DOGS.
(*By Otto Sinding, from a Photograph.*)

Our team had got badly mixed up during the battle, and it took some time to disentangle them. At last everything was once more ready for the start. Trontheim cracked his whip, and called, "Pr-r-r-r, pr-r-r-r," and off we went at a wild gallop, over grass, clay, and stones, until it seemed as if they were going to carry us right across the lagoon at the mouth of the river. I kicked and pulled in with all my might, but was dragged along,

and it was all that Trontheim and I with our united strength could do to stop them just as they were going into the water, although we shouted "Sass, sass," so that it echoed over the whole of Khabarova. But at last we got our team turned in another direction, and off we set again merrily at such a pace that I had enough to do to hold on. It was an extraordinary summer ride; and it gave us a high opinion of the dogs' strength, seeing how easily they drew two men over this, to put it mildly, bad sledging ground. We went on board again well satisfied, also the richer, by a new experience; having learnt that dog-driving, at any rate to begin with, requires much patience.

Siberian dog-harness is remarkably primitive. A thick rope or a strap of sail-cloth passes round the animal's back and belly. This is held in its place above by a piece of cord attached to the collar. The single trace is fastened under the belly, goes back between the legs, and must often plague the animal. I was unpleasantly surprised when I noticed that, with four exceptions, all the dogs were castrated; and this surprise I did not conceal. But Trontheim on his side was at least equally astonished, and informed me that in Siberia castrated dogs are considered the best.* This was a disappointment to me, as I had reckoned on my canine family

* The ordinary male dog is liable to get inflammation of the scrotum from the friction of the trace.

increasing on the way. For the present I should just have to trust to the four "whole" dogs and "Kvik," the bitch I had brought with me from home.

Next day, August 1st, there was a great religious festival in Khabarova, that of St. Elias. Samoyedes from far and near had come in with their reindeer teams to celebrate the day by going to church and then getting roaring drunk. We were in need of men in the morning to help with filling the boiler with fresh water and the tank with drinking-water, but on account of this festival it was difficult to get hold of any at all. At last, by dint of promising sufficient reward, Trontheim succeeded in collecting some poor fellows who had not money enough to drink themselves as drunk as the day required of them. I was on shore in the morning, partly to arrange about the provision of water, partly to collect fossils, in which the rock here abounds, especially one rock below Sibiriakoff's warehouse. I also took a walk up the hill to the west, to Trontheim's flagstaff, and looked out to sea in that direction after the *Urania*. But there was nothing to be seen except an unbroken sea-line. Loaded with my find I returned to Khabarova, where I, of course, took advantage of the opportunity to see something of the festival.

From early morning the women had been dressed in their finest clothes—brilliant colours, skirts with many tucks, and great coloured bows at the end of plaits of hair which hung far down their backs. Before service,

an old Samoyede and a comely young girl led out a lean reindeer which was to be offered to the church—to the old church, that is to say. Even up here, as already mentioned, religious differences have found their way. Nearly all the Samoyedes of these parts belong to the old faith and attend the old church. But they go occasionally to the new one too; as far as I could make out, so as not to offend the priest and Sibiriakoff—or perhaps to be surer of heaven? From what I got out of Trontheim on the subject, the chief difference between the two religions lies in the way they make the sign of the cross or something of that sort. To-day was high festival in both churches. All the Samoyedes first paid a short visit to the new church and then immediately streamed over into the old one. The old church was for the moment without a priest, but to-day they had clubbed together and offered the priest of the new church 2 roubles to hold a service in the old one too. After careful consideration, he agreed, and in all his priestly pomp crossed the old threshold. The air inside was so bad that I could not stand it for more than two minutes, so I now made my way on board again.

During the afternoon the howling and screaming began, and increased as time went on. We did not need to be told that the serious part of the festival had now begun. Some of the Samoyedes tore about over the plain with their reindeer teams like furious animals. They could not sit on their sledges, but lay on them or

were dragged behind them, howling. Some of my comrades went on shore, and brought back anything but an edifying account of the state of things. Every single

EVENING SCENE AT KHABAROVA.
(By Otto Sinding, from a Photograph.)

man and woman appeared to be drunk, reeling about the place. One young Samoyede in particular had made an ineffaceable impression on them. He mounted a sledge,

lashed at the reindeer, and drove "amuck" in among the tents, over the tied-up dogs, foxes, and whatever came in his way; he himself fell off the sledge, was caught in the reins, and dragged behind, shrieking, through sand and clay. Good Saint Elias must be much flattered by such homage. Towards morning the howling gradually died away, and the whole town slept the loathsome sleep of the drunkard.

There was not a man to be got to help with our coal-shifting next day. Most of them slept all day after the orgie of the night. We had just to do without help; but we had not finished by evening, and I began to be impatient to get away. Precious time was passing; I had long ago given up the *Urania*. We did not really need more coal. The wind had been favourable for several days. It was a south wind, which was certainly blowing the ice to the northward in the Kara Sea. Sverdrup was now positive that we should be able to sail in open water all the way to the New Siberian Islands, so it was his opinion that there was no hurry for the present. But hope is a frail reed to lean on, and my expectations were not quite so bright; so I hurried things on, to get away as soon as possible.

At the supper table this evening King Oscar's gold medal of merit was solemnly presented to Trontheim, in recognition of the great care with which he had executed his difficult commission, and the valuable assistance thereby rendered to the expedition. His

O. CHRISTOFERSEN AND A. TRONTHEIM.

(From a photograph.)

honest face beamed at the sight of the beautiful medal and the bright ribbon.

Next day, August 3rd, we were at last ready for a start, and the 34 dogs were brought on board in the afternoon, with great noise and confusion. They were all tied up on the deck forward, and began by providing more musical entertainment than we desired. By evening the hour had come. We got up steam—everything was ready. But such a thick fog had set in that we could not see the land. Now came the moment when our last friend, Christofersen, was to leave the ship. We supplied him with the barest sufficiency of provisions and some Ringnes's ale. While this was being done, last lines were added in feverish eagerness to the letters home. Then came a last handclasp; Christofersen and Trontheim got into the boat, and had soon disappeared in the fog. With them went our last post; our last link with home was broken. We were alone in the mist on the sea. It was not likely that any message from us would reach the world before we ourselves brought the news of our success or defeat. How much anxiety were those at home to suffer between now and then? It is true we might possibly be able to send letters home from the mouth of the Olenek, where, according to the agreement with Baron Toll, we were to call in for another supply of dogs; but I did not consider this probable. It was far on in the summer, and I had an instinctive feeling that the state of the ice was not so favourable as I could have wished it to be.

Trontheim's Narrative.

Alexander Ivanovitch Trontheim has himself given an account, in the Tobolsk official newspaper, of his long and difficult journey with our dogs. The account was written by A. Kryloff from Trontheim's story. The following is a short *résumé* :—

After having made the contract with Baron Toll, Trontheim was on January 28th (January 16th by Russian reckoning) already at Berezoff, where there was then a Yassak-meeting,* and consequently a great assembly of Ostiaks and Samoyedes. Trontheim made use of this opportunity and bought 33 (this ought probably to be 40) choice sledge dogs. These he conveyed to the little country town of Muzhi, where he made preparations for the "very long journey," passing the time in this way till April 16th. By this date he had prepared 300 pud (about 9,600 lbs.) of dog provender, consisting chiefly of dried fish. For 300 roubles he engaged a Syriane, named Terentieff, with a reindeer herd of 450, to convey him, his dogs, and baggage to Yugor Strait. For three months these two with their caravan—reindeer, drivers, dogs, women, and children—travelled through the barren tracts of northern Siberia. At first their route lay through the Ural

* Yassak is a tax paid in fur by the Siberians.

Mountains. "It was more a sort of nomadic life than a journey. They did not go straight on towards their destination, but wandered over wide tracts of country, stopping wherever it was suitable for the reindeer, and where they found lichen. From the little town of Muzhi the expedition passed up the Voikara River to its sources; and here began the ascent of the Ural Mountains by the Pass of Kjaila (Kjola). In their crossing of the chain they tried to skirt along the foot of the mountains, climbing as little as possible. . . ."

"They noticed one marked contrast between the mountains in the northern and those in the southern part of the Ural chain. In the south the snow melts quickly in the lower regions and remains lying on the tops. Here (in the northern Ural), on the contrary, the mountain tops are free from snow before the sun's rays penetrate into the valleys and melt it there. In some valleys, especially those closed by mountains to the south, and more exposed to north winds, the snow lies the whole summer. When they had got across the Ural Mountains they first followed the course of the River Lemva, then crossed it, and now followed a whole system of small rivers, for which even the natives have no names. At last, on May 4th, the expedition reached the River Ussa, on the banks of which lay the hut of the Syriane Nikitsa." This was "the one inhabited spot in this enormous tract of country," and here they stopped two weeks to rest the reindeer and get provender for them.

"The country lying between the sources of the Voikara and the Ussa is wooded in every direction." Between the River Ussa and the River Vorkuta, and even beyond that, Trontheim and his company travelled through quite luxuriant wood. In the middle of May, as the caravan approached the tundra region, the wood got thinner and thinner, and by May 27th it was nothing but scattered underwood. After this came quite small bushes and weeds, and then at last the interminable tundra came in sight. Not to be without fuel on the tundra they felled some dead trees and other wood, eight sledge loads. The day after they got out on the tundra (May 29th) the caravan set off at full speed, the Syrianes being anxious to get quickly past a place where a whole herd of reindeer had perished some years before. The reindeer-drivers take good note of such places, and do everything possible to avoid them, as the animals may easily be infected by gnawing the bones of their dead comrades. God help the herd that this happens to! The disease passes rapidly from animal to animal, and scores may die of it in a day.*

"In this region there are many bogs; the low land forms one continuous morass. Sometimes we had to walk up to the waist in water; thus on June 5th we splashed about the whole day in water, in constant fear of the dogs catching cold. On the 6th a strong north-

* This disease is probably anthrax, or something of the same nature.

east wind blew, and at night the cold was so severe that two reindeer-calves were frozen to death; and besides this two grown ones were carried off by wolves."

The caravan had often to cross rapid rivers, where it was sometimes very difficult to find a ford. They were frequently obliged to construct a bridge with the help of tent poles and sometimes blocks of ice, and it occasionally took them a whole day to get across. By degrees their supply of wood was used up, and it was difficult to get food cooked. Few bushes were to be found. On June 17th they met a Syriane reindeer driver and trader; from him they bought two bottles of wine (brandy) at 70 kopecks each. "It was, as is customary, a very friendly encounter, and ended with treatings on both sides. One can see a long way on the tundra; the Syriane's keen eye detects another herd, or smoke from inhabited tents, 10 versts off; and a nomad who has discovered the presence of another human being 10 or 12 versts off never lets slips the opportunity of visiting him in his camp, having a talk, and being regaled with tea, or, in preference, brandy. The day after, June 18th, some Samoyedes, who had heard of the caravan, came on four sledges to the camp. They were entertained with tea. The conversation, carried on in Samoyede, was about the health of the reindeer, our journey, and the way to Yugor Strait. When the scanty news of the tundra had been well discussed they took their departure."

By the end of June, when they had got through all the ramifications of the Little Ural Mountains, the time was drawing near when, according to his agreement, Trontheim was due at Yugor Strait. He was obliged to hasten the rate of travelling, which was not an easy matter, with more than 40 sledges and 450 reindeer, not counting the calves. He, therefore, determined to divide the caravan into two parts, leave the women, children, and domestic animals behind, and push forward without any baggage, except the necessary food. So on June 28th "thirty sledges, tents, etc., were left with the women and children, who were to live their nomadic life as best they could. The male Syrianes took ten sledges and went on with Trontheim." At last, on July 9th, after more wanderings, they saw the sea from a "high hill," and next day they reached Khabarova, where Trontheim learned that no steamer had arrived yet in Yugor Strait, nor had any sail been seen. At this time the whole shore of Yugor Strait and all the sea within sight was covered with ice, driven there by northerly winds. The sea was not quite open till July 22nd. Trontheim passed the time while he was waiting for the *Fram* in hunting and making excursions with his dogs, which were in excellent condition. He was often in the Sibiriakoff colony, a meeting place for the Samoyedes of the district, who come here in considerable numbers to dispose of their wares. And it was a melancholy phase of life he saw here in this little "world-

forsaken" colony. "Every summer two or three merchants or peasant traders, generally from Pustozersk, come for the purpose of bartering with the Samoyedes, and sometimes the Syrianes, too, for their wares—bear-skins, blubber, and sealskins, reindeer skins, and such like—giving in exchange tea, sugar, flour, household utensils, etc. No transaction takes place without the drinking of brandy, for which the Samoyede has an insatiable craving. When the trader has succeeded in making a poor wretch quite tipsy, he fleeces him, and buys all he wants at some ridiculous price—the result of the transaction generally being that the Samoyede is in debt to his 'benefactor.' All the traders that come to the colony bring brandy, and one great drinking bout goes on all the summer. You can tell where much business is done by the number of brandy casks in the trader's booth. There is no police inspection, and it would be difficult to organise anything of the kind. As soon as there is snow enough for the sledges, the merchants' reindeer caravans start from the colony on their homeward journey, loaded with empty brandy casks and with the proceeds of this one-sided bartering."

"On July 30th [this ought to be 29th] Trontheim saw from the shore, first, smoke, and soon after a steamer. There could be no doubt of its being the *Fram*. He went out in a little Samoyede boat to meet her, and called out in Russian that he wanted to be taken on board. From the steamer they called back asking who

he was, and when they heard his name he was hauled up. On deck he met Nansen himself, in a greasy working jacket. He is still quite a young man, of middle height . . . " Here follows a flattering description of the leader of the expedition, and the state of matters on board. " It is evident," he then goes on, "that we have here one family, united and inspired by one idea, for the carrying out of which all labour devotedly. The hard and dirty work on board is fairly divided, no difference being made between the common sailor and the captain, or even the chief of the expedition. The doctor, too, takes his share in the general work, and this community of labour is a close bond between all on board. The existence of such relations among the ship's company made a very favourable impression on Trontheim, and this most of all (in his opinion) justified the hope that in difficult crises the expedition would be able to hold its own."

"A. I. Trontheim was on board the *Fram* every day, breakfasting and dining there. From what he relates, the ship must be admirably built, leaving nothing whatever to be desired. The cabins are roomy, and comfortably fitted up; there is an excellent library, containing the classics of European literature; various musical instruments, from a beautiful grand piano* to

* By this he probably means our organ. Our other musical instruments were as follows:—An accordion, belonging to the ship, and a flute, violin, and several Jew's harps, belonging to one of the ship's company.

flutes and guitars; then chess, draughts, etc., all for the recreation of the company."

Here follows a description of the *Fram*, her general equipments, and commissariat. It seems to have made a great impression on him that we had no wine (brandy) on board. "I was told," he exclaims, "that only among the medicine stores have they some 20 or 30 bottles of the best cognac—pure, highly rectified spirit. It is Nansen's opinion that brandy-drinking in these northern regions is injurious, and may, if indulged in on such a difficult and dangerous voyage, have very serious consequences; he has therefore considered it expedient to supply its place by fruit and various sorts of sweets, of which there are large supplies on board." "In harbour the crew spent most of the day together; in spite of community of work, each individual's duties are fixed down to the minutest detail. They all sit down to meals together, with the exception of the acting cook; whose duty they take by turns. Health and good spirits are to be read on every face; Nansen's immovable faith in a successful and happy issue to their expedition inspires the whole crew with courage and confidence."

"On August 3rd they shifted coal on board the *Fram*, from the ship's hold down to the stoke hold (coal bunkers). All the members of the expedition took part in this work, Nansen at their head, and they worked unitedly and cheerfully. This same day Nansen and his

companions tried the dogs on shore. Eight [this should be ten] were harnessed to a sledge on which three persons took their places. Nansen expressed his satisfaction with the dogs, and thanked Trontheim for the good selection he had made, and for the excellent condition the animals were in. When the dogs were taken over and brought on board,* Trontheim applied to Nansen for a certificate of the exact and scrupulous way in which he had fulfilled his contract. Nansen's answer was: 'No; a certificate is not enough. Your duty has been done with absolute conscientiousness, and you have thereby rendered a great service to the expedition. I am commissioned to present you with a gold medal from our king in recognition of the great help you have given us.' With these words Nansen handed to Trontheim a very large gold medal with a crown on it. On the obverse is the following inscription: 'Oscar II., King of Norway and Sweden. For the Welfare of the Brother-Nations.' And on the reverse: 'Reward for valuable service, A. I. Trontheim.' Along with this Nansen also gave Trontheim a written testimonial as to the admirable manner in which he had carried out his commission, mentioning that for this he had been rewarded with a medal."

"Nansen determined to weigh anchor during the

* It will be observed that there is some slip of memory here—it was the evening before.

night of this same day* and set sail on his long voyage without waiting for the coal sloop *Urania*, which he thought must have been delayed by the ice. In the evening Trontheim took leave of the whole party, with hearty wishes for the success of the expedition. Along with him Herr Ole Christofersen, correspondent of one of the chief London newspapers,† left the ship. He had accompanied Nansen from Vardö. At parting, Nansen gave them a plentiful supply of provisions, Christofersen and Trontheim having to await the arrival of the *Urania*, as they were to go home by her. Precisely at 12 o'clock on the night between August 4th and 5th the signal for starting was given, and the *Fram* stood out to sea."

On August 7th the *Urania* at last arrived. As I had supposed, she had been stopped by ice; but had at last got out of it uninjured. Christofersen and Trontheim were able to sail for home in her on the 11th, and reached Vardö on the 22nd, food having been very scarce during the last part of the time. The ship, which had left her home port, Brönö, in May, was not provided for so long a voyage, and these last days they lived chiefly on dry biscuits, water, and—weevils.

* It was, in fact, the day after.

† I do not believe that Christofersen ever in his life had anything to do with a London newspaper.

CHAPTER V

Voyage through the Kara Sea.

It was well into the night after Christofersen and Trontheim had left us, before we could get away. The channel was too dangerous for us to risk it in the thick fog. But it cleared a little, and the petroleum launch was got ready; I had determined to go on ahead with it and take soundings. We started about midnight. Hansen stood in the bow with the lead line. First we bore over towards the point of Vaigats to the north-west, as Palander directs, then on through the strait, keeping to the Vaigats side. The fog was often so thick that it was with difficulty we could catch a glimpse of the *Fram*, which followed close behind us, and on board the *Fram* they could not see our boat. But so long as we had enough water, and so long as we saw that they were keeping to the right course behind us, we went ahead. Soon the fog cleared again a little. But the depth was not quite satisfactory; we had been having steadily $4\frac{1}{2}$ to 5 fathoms; then it dropped to 4 and then to $3\frac{1}{2}$. This was too little. We turned and signalled to the

Fram to stop. Then we held farther out from land and got into deeper water, so that the *Fram* could come on again at full speed.

From time to time our petroleum engine took to its old tricks and stopped. I had to pour in more oil to set it going again, and as I was standing doing this, the boat gave a lurch, so that a little oil was spilt, and took fire. The burning oil ran over the bottom of the boat, where a good deal had been spilt already. In an instant the whole stern was in a blaze, and my clothes, which were sprinkled with oil, caught fire. I had to rush to the bow, and for a moment the situation was a critical one, especially as a big pail that was standing full of oil also took fire. As soon as I had stopped the burning of my clothes, I rushed aft again, seized the pail, and poured the flaming oil into the sea, burning my fingers badly. At once the whole surface of the water round was in flames. Then I got hold of the baler, and baled water into the boat as hard as I could; and soon the worst was over. Things had looked anything but well from the *Fram*, however, and they were standing by with ropes and buoys to throw to us.

Soon we were out of Yugor Strait. There was now so little fog that the low land round us was visible, and we could also see a little way out to sea, and, in the distance, all drift-ice. At 4 o'clock in the morning (August 4th) we glided past Sokolii, or Hawk Island, out into the dreaded Kara Sea.

Now our fate was to be decided, I had always said that if we could get safely across the Kara Sea and past Cape Chelyuskin, the worst would be over. Our prospects were not bad--an open passage to the east, along the land, as far as we could see from the masthead.

An hour and a half later we were at the edge of the ice. It was so close that there was no use in attempting to go on through it. To the north-west it seemed much looser, and there was a good deal of blue in the atmosphere at the horizon there.* We kept south-east along the land through broken ice, but in the course of the day went further out to sea, the blueness of the atmosphere to the east and north-east promising more open water in that direction. However, about 3 p.m. the ice became so close, that I thought it best to get back into the open channel along the land. It was certainly possible that we might have forced our way through the ice in the sea here, but also possible that we might have stuck fast, and it was too early to run this risk.

Next morning (August 5th), being then off the coast near to the mouth of the River Kara, we steered across towards Yalmal. We soon had that low land in sight, but in the afternoon we got into fog and close ice. Next

* There is a white reflection from white ice, so that the sky above fields of ice has a light or whitish appearance; wherever there is open water it is blue or dark. In this way the Arctic navigator can judge by the appearance of the sky what is the state of the sea at a considerable distance.

day it was no better, and we made fast to a great ice-block which was lying stranded off the Yalmal coast.

In the evening some of us went on shore. The water was so shallow that our boat stuck fast a good way from the beach, and we had to wade. It was a perfectly flat, smooth sand beach, covered by the sea at full tide, and

By Otto Sinding. LANDING ON YALMAL. *[from a Photograph.*

beyond that a steep sand bank, 30 to 40 feet, in some places probably 60 feet high.

We wandered about a little. Flat, bare country on every hand. Any driftwood we saw was buried in the sand, and soaking wet. Not a bird to be seen except one or two snipe. We came to a lake, and out of the fog in front of me I heard the cry of a loon, but saw no

living creature. Our view was blocked by a wall of fog whichever way we turned. There were plenty of reindeer tracks, but of course they were only those of the Samoyedes' tame reindeer. This is the land of the Samoyedes—and oh! but it is desolate and mournful! The only one of us that bagged anything was the

By Otto Sinding.] THE PLAIN OF YALMAL. [*From a Photograph.*

botanist. Beautiful flowers smiled to us here and there among the sand mounds—the one message from a brighter world in this land of fogs. We went far in over the flats, but came only to sheets of water, with low spits running out into them, and ridges between. We often heard the cry of loons on the water, but could

never catch sight of one. All these lakelets were of a remarkable, exactly circular conformation, with steep banks all round, just as if each had dug out a hole for itself in the sandy plain.

With the oars of our boat and a large tarpaulin we had made a sort of tent. We were lucky enough to find a little dry wood, and soon the tent was filled with the fragrant odour of hot coffee. When we had eaten and drunk and our pipes were lit, Johansen, in spite of fatigue and a full meal, surprised us by turning one somersault after another on the heavy, damp sand in front of the tent in his long military cloak and sea boots half full of water.

By 6.30 next morning we were on board again. The fog had cleared, but the ice, which lay drifting backwards and forwards according to the set of the tide, looked as close as ever towards the north. During the morning we had a visit from a boat with two stalwart Samoyedes, who were well received and treated to food and tobacco. They gave us to understand that they were living in a tent some distance inland and farther north. Presently they went off again, enriched with gifts. These were the last human beings we met.

Next day the ice was still close, and, as there was nothing else to be done, some of us went ashore again in the afternoon, partly to see more of this little-known coast, and partly, if possible, to find the Samoyedes' camp, and get hold of some skins and reindeer flesh.

It is a strange, flat country. Nothing but sand, sand everywhere. Still flatter, still more desolate than the country about Yugor Strait, with a still wider horizon. Over the plain lay a green carpet of grass and moss, here and there spoiled by the wind having torn it up and swept sand over it. But trudge as we might, and search as we might, we found no Samoyede camp. We saw

IN THE KARA SEA.

three men in the far distance, but they went off as fast as they could the moment they caught sight of us. There was little game—just a few ptarmigan, golden plovers, and long-tailed ducks. Our chief gain was another collection of plants, and a few geological and geographical notes. Our observations showed that the land at this place was charted not less than half a degree or 36 to 38 minutes too far west.

It was not till next forenoon (August 9th) that we went on board again. The ice to the north now seemed to be rather looser, and at 8 p.m. we at last began once more to make our way north. We found ice that was easy to get through, and held on our course until, three days later, we got into open water. On Sunday, August 18th, we stood out into the open Kara Sea, past the north point of Yalmal and Bieloi-Ostrov (White Island). There was no ice to be seen in any direction. During the days that followed we had constant strong east winds, often increasing to half a gale. We kept on tacking to make our way eastward, but the broad and keel-less *Fram* can hardly be called a good "beater;" we made too much lee-way, and our progress was correspondingly slow. In the journal there is a constantly-recurring entry of "Head wind, Head wind." The monotony was extreme, but as they may be of interest as relating to the navigation of this sea, I shall give the most important items of the journal, especially those regarding the state of the ice.

On Monday, August 14th, we beat with only sail against a strong wind. Single pieces of ice were seen during the middle watch, but after that there was none within sight.

Tuesday, August 15th. The wind slackened in the middle watch; we took in sail, and got up steam. At 5 in the morning we steamed away east over a sea perfectly clear of ice; but after mid-day the wind began

to freshen again from E.N.E., and we had to beat with steam and sail. Single floes of ice were seen during the evening and night.

Wednesday, August 16th. As the Kara Sea seemed so extraordinarily free from ice, and as a heavy sea was running from the north-east, we decided to hold north as far as we could, even if it should be to the Einsamkeit (Lonely) Island. But about half-past three in the afternoon we had a strip of close ice ahead, so that we had to turn. Stiff breeze and sea. Kept on beating east along the edge of the ice. Almost lost the petroleum launch in the evening. The waves were constantly breaking into it and filling it, the gunwale was burst in at two places, and the heavy davits it hung on were twisted as as if they had been copper wires. Only just in the nick of time, with the waves washing over us, some of us managed to get it lashed to the side of the ship. There seemed to be some fatality about this boat.

Thursday, August 17th. Still beating eastward under sail and steam through scattered ice, and along a margin of fixed ice. Still blowing hard, with a heavy sea as soon as we headed a little out from the ice.

Friday, August 18th. Continued storm. Stood south-east. At 4.30 a.m., Sverdrup, who had gone up into the crow's-nest to look out for bears and walrus on the ice-floes, saw land to the south of us. At 10 a.m. I went up to look at it—we were then probably not more than 10 miles away from it. It was low land, seemingly of

THE FRAM IN THE KARA SEA.

(By Otto Sinding.)

the same formation as Yalmal, with steep sandbanks and grass-grown above. The sea grew shallower as we neared it. Not far from us, small icebergs lay aground. The lead showed steadily less and less water; by 11.30 a.m., there were only some 8 fathoms, then to our surprise the bottom suddenly fell to 20 fathoms, and after that we found steadily increasing depth. Between the land and the blocks of stranded ice on our lee there appeared to be a channel with rather deeper water and not so much ice aground in it. It seemed difficult to conceive that there should be undiscovered land here, where both Nordenskiöld and Edward Johansen, and possibly several Russians, had passed without seeing anything. Our observations, however, were incontestable, and we immediately named the land Sverdrup's Island, after its discoverer.

As there was still a great deal of ice to windward, we continued our south-westerly course, keeping as close to the wind as possible. The weather was clear, and at 8 o'clock we sighted the mainland, with Dickson's Island ahead. It had been our intention to run in and anchor here, in order to put letters for home under a cairn, Captain Wiggins having promised to pick them up on his way to the Yenisei. But in the meantime the wind had fallen —it was a favourable chance, and time was precious. So gave up sending our post, and continued our course along the coast.

The country here was quite different from Yalmal.

Though not very high, it was a hilly country, with patches and even large drifts of snow here and there, some of them lying close down by the shore. Next morning I sighted the southernmost of the Kamenni Islands. We took a tack in under it to see if there were animals of any kind, but could catch sight of none. The island rose evenly from the sea at all points, with steep shores. They consisted for the most part of rock, which was partly solid, partly broken up by the action of the weather into heaps of stones. It appeared to be a

OSTROVA KAMENNI (ROCKY ISLAND) OFF THE COAST OF SIBERIA.

stratified rock, with strongly marked oblique strata. The island was also covered with quantities of gravel, sometimes mixed with larger stones; the whole of the northern point seemed to be a sand heap, with steep sand-banks towards the shore. The most noticeable feature of the island was its marked shore lines. Near the top there was a specially pronounced one, which was like a sharp ledge on the west and north sides, and stretched across the island like a dark band. Nearer the beach were several other distinct ones. In

form they all resembled the upper one with its steep ledges, and had evidently been formed in the same way, by the action of the sea, and more especially of the ice. Like the upper one, they also were most marked on the west and north sides of the island, which are those facing most to the open sea.

To the student of the history of the earth these marks of the former level of the sea are of great interest, showing as they do that the land has risen or the sea sunk since the time they were formed. Like Scandinavia, the whole of the north coast of Siberia has undergone these changes of level since the Great Ice Age.

It was strange that we saw none of the islands which, according to Nordenskiöld's map, stretch in a line to the north-east from Kamenni Island. On the other hand, I took the bearings of one or two other islands lying almost due east, and next morning we passed a small island farther north.

We saw few birds in this neighbourhood—only a few flocks of geese, some Arctic gulls (*Lestris parasitica* and *L. buffonii*), and a few sea-gulls and tern.

On Sunday, August 20th, we had, for us, uncommonly fine weather—blue sea, brilliant sunshine, and light wind, still from the north-east. In the afternoon we ran in to the Kjellman Islands. These we could recognise from their position on Nordenskiöld's map, but south of them we found many unknown ones. They

all had smoothly rounded forms, these Kjellman Islands, like rocks that have been ground smooth by the glaciers of the Ice Age. The *Fram* anchored on the

THEODOR C. JACOBSEN, MATE OF THE "FRAM."
(From a Photograph, December 11th, 1893.)

north side of the largest of them, and whilst the boiler was being refitted, some of us went ashore, in the evening, for some shooting. We had not left the ship when the

mate, from the crow's-nest, caught sight of reindeer. At once we were all agog; everyone wanted to go ashore, and the mate was quite beside himself with the hunter's fever, his eyes as big as saucers, and his hands trembling as though he were drunk. Not until we were in the boat had we time to look seriously for the mate's reindeer. We looked in vain—not a living thing was to be seen in any direction. Yes—when we were close in shore, we at last descried a large flock of geese waddling upward from the beach. We were base enough to let a conjecture escape us, that these were the mate's reindeer—a suspicion which he at first rejected with contempt. Gradually, however, his confidence oozed away. But it is possible to do an injustice even to a mate. The first thing I saw when I sprang ashore was old reindeer tracks. The mate had now the laugh on his side, ran from track to track, and swore that it was reindeer he had seen.

When we got up on to the first height we saw several reindeer on flat ground to the south of us; but the wind being from the north, we had to go back and make our way south along the shore till we got to leeward of them. The only one who did not approve of this plan was the mate, who was in a state of feverish eagerness to rush straight at some reindeer he thought he had seen to the east, which, of course, was an absolutely certain way to clear the field of everyone of them. He asked and received permission to remain behind with Hansen, who

was to take a magnetic observation ; but had to promise not to move till he got the order.

On the way along the shore we passed one great flock of geese after another ; they stretched their necks and waddled aside a little, until we were quite near, and only then took flight ; but we had no time to waste on such small game. A little further on we caught sight of one or two reindeer we had not noticed before. We could easily have stalked them, but were afraid of getting to windward of the others, which were farther south. At last we got to leeward of these latter also, but they were grazing on flat ground, and it was anything but easy to stalk them—not a hillock, not a stone to hide behind. The only thing was to form a long line, advance as best we could, and, if possible, outflank them. In the meantime we had caught sight of another herd of reindeer farther to the north, but suddenly, to our astonishment, saw them tear off across the plain eastward, in all probability startled by the mate, who had not been able to keep quiet any longer.

A little to the north of the reindeer nearest us there was a hollow, opening from the shore, from which it seemed that it might be possible to get a shot at them. I went back to try this, whilst the others kept their places in the line. As I went down again towards the shore I had the sea before me, quiet and beautiful. The sun had gone down behind it not long before, and the sky was glowing in the clear, light night. I had to

stand still for a minute. In the midst of all this beauty, man was doing the work of a beast of prey! At this moment I saw to the north a dark speck move down the height where the mate and Hansen ought to be. It divided into two, and the one moved east, just to the windward of the animals I was to stalk. They would get the scent immediately, and be off. There was nothing for it but to hurry on, while I rained anything but good wishes on these fellows' heads. The gully was not so deep as I had expected. Its sides were just high enough to hide me when I crept on all fours. In the middle were large stones and clayey gravel, with a little runnel soaking through them. The reindeer were still grazing quietly, only now and then raising their heads to look round. My "cover" got lower and lower, and to the north I heard the mate. He would presently succeed in setting off my game. It was imperative to get on quickly, but there was no longer cover enough for me to advance on hands and knees. My only chance was to wriggle forward like a snake on my stomach. But in this soft clay—in the bed of the stream? Yes—meat is too precious on board, and the beast of prey is too strong in a man. My clothes must be sacrificed; on I crept on my stomach through the mud. But soon there was hardly cover enough even for this. I squeezed myself flat among the stones and ploughed forward like a drain-cutting machine. And I did make way, if not quickly and comfortably, still surely.

All this time the sky was turning darker and darker red behind me, and it was getting more and more difficult to use the sights of my gun, not to mention the trouble I had in keeping the clay from them and from the muzzle. The reindeer still grazed quietly on. When they raised their heads to look round I had to lie as quiet as a mouse, feeling the water trickling gently under my stomach; when they began to nibble the moss again, off I went through the mud. Presently I made the disagreeable discovery that they were moving away from me about as fast as I could move forward, and I had to redouble my exertions. But the darkness was getting worse and worse, and I had the mate to the north of me, and presently he would start them off. The outlook was anything but bright either morally or physically. The hollow was getting shallower and shallower, so that I was hardly covered at all; I squeezed myself still deeper into the mud. A turn in the ground helped me forward to the next little height, and now they were right in front of me, within what I should have called easy range if it had been daylight. I tried to take aim, but could not see the bead on my gun.

Man's fate is sometimes hard to bear. My clothes were dripping with wet clay, and after what seemed to me most meritorious exertions, here I was at the goal, unable to take advantage of my position. But now the reindeer moved down into a small depression. I crept forward a little way further as quickly as I could.

I was in a splendid position, so far as I could tell in the dark, but I could not see the bead any better than before. It was impossible to get nearer, for there was only a smooth slope between us. There was no sense in thinking of waiting for light to shoot by; it was now midnight, and I had that terrible mate to the north of me, besides the wind was not to be trusted. I held the rifle up against the sky to see the bead clearly, and then lowered it on the reindeer. I did this once, twice, thrice. The bead was still far from clear; but all the same I thought I might hit, and pulled the trigger. The two deer gave a sudden start, looked round in astonishment, and bolted off a little way south. There they stood still again, and at this moment were joined by a third deer, which had been standing rather farther north. I fired off all the cartridges in the magazine, and all to the same good purpose. The creatures started and moved off a little at each shot, and then trotted farther south. Presently they made another halt, to take a long careful look at me; and I dashed off westward, as hard as I could run, to turn them. Now they were off straight in the direction where some of my comrades ought to be. I expected every moment to hear shots and see one or two of the animals fall; but away they ambled southwards, quite unchecked. At last, far to the south, crack went a rifle. I could see by the smoke that it was at too long a range; so in high dudgeon I shouldered my rifle and lounged in the direc-

tion of the shot. It was pleasant to see such a good result for all one's trouble.

No one was to be seen anywhere. At length I met Sverdrup; it was he who had fired. Soon Blessing joined us, but all the others had long since left their posts. Whilst Blessing went back to the boat and his botanising box, Sverdrup and I went on to try our luck once more. A little farther south we came to a valley stretching right across the island. On the further side of it we saw a man standing on a hillock, and not far from him a herd of five or six reindeer. As it never occurred to us to doubt that the man was in the act of stalking these, we avoided going in that direction, and soon he and his reindeer disappeared to the west. I heard afterwards that he had never seen the deer. As it was evident that when the reindeer to the south of us were startled, they would have to come back across this valley, and as the island at this part was so narrow that we commanded the whole of it, we determined to take up our posts here and wait. We accordingly got in the lee of some great boulders, out of the wind. In front of Sverdrup was a large flock of geese, near the mouth of the stream, close down by the shore. They kept up an incessant gabble, and the temptation to have a shot at them was very great; but, considering the reindeer, we thought it best to leave them in peace. They gabbled and waddled away down through the mud, and soon took wing.

The time seemed long. At first we listened with all

HENRIK BLESSING.

(From a photograph taken in 1895.)

our ears—the reindeer must come very soon—and our eyes wandered incessantly back and forwards along the slope on the other side of the valley. But no reindeer came, and soon we were having a struggle to keep our eyes open and our heads up—we had not had much sleep the last few days. They *must* be coming! We shook ourselves awake, and gave another look along the bank, till again the eyes softly closed and the heads began to nod, while the chill wind blew through our wet clothes, and I shivered with cold. This sort of thing went on for an hour or two, until the sport began to pall on me, and I scrambled from my shelter along towards Sverdrup, who was enjoying it about as much as I was. We climbed the slope on the other side of the valley, and were hardly at the top before we saw the horns of six splendid reindeer on a height in front of us. They were restless, scenting westward, trotting round in a circle, and then sniffing again. They could not have noticed us as yet, as the wind was blowing at right angles to the line between them and us. We stood a long time watching their manœuvres, and waiting their choice of a direction, but they had apparently great difficulty in making it. At last off they swung south and east, and off we went south-east as hard as we could go, to get across their course before they got scent of us. Sverdrup had got well ahead, and I saw him rushing across a flat piece of ground—presently he would be at the right place to meet them. I stopped, to be in readiness to cut them

off on the other side if they should face about and make off northward again. There were six splendid animals, a big buck in front. They were heading straight for Sverdrup, who was now crouching down on the slope. I expected every moment to see the foremost fall. A shot rang out! Round wheeled the whole flock like lightning, and back they came at a gallop. It was my turn now to run with all my might, and off I went over the stones, down towards the valley we had come from. I only stopped once or twice to take breath and to make sure that the animals were coming in the direction I had reckoned on—then off again. We were getting near each other now, they were coming on just where I had calculated, the thing now was to be in time for them. I made my long legs go their fastest over the boulders, and took leaps from stone to stone that would have surprised myself at a more sober moment. More than once my foot slipped and I went down head first among the boulders, gun and all. But the wild beast in me had the upper hand now. The passion of the chase vibrated through every fibre of my body.

We reached the slant of the valley almost at the same time—a leap or two to get up on some big boulders, and the moment had come—I *must* shoot, though the shot was a long one. When the smoke cleared away I saw the big buck trailing a broken hind-leg. When their leader stopped, the whole flock turned and ran in a ring round the poor animal. They could not understand

what was happening, and strayed about wildly with the balls whistling round them. Then off they went down the side of the valley again, leaving another of their number behind with a broken leg. I tore after them, across the valley and up the other side, in the hope of getting another shot, but gave that up and turned back to make sure of the two wounded ones. At the bottom of the valley stood one of the victims awaiting its fate. It looked imploringly at me, and then, just as I was going forward to shoot it, made off much quicker than I could have thought it possible for an animal on three legs to go. Sure of my shot, of course I missed; and now began a chase, which ended in the poor beast, blocked in every other direction, rushing down towards the sea and wading into a small lagoon on the shore, whence I feared it might get right out into the sea. At last it got its quietus there in the water. The other one was not far off, and a ball soon put an end to its sufferings also. As I was proceeding to rip it up, Henriksen and Johansen appeared; they had just shot a bear a little farther south.

After disembowelling the reindeer, we went towards the boat again, meeting Sverdrup on the way. It was now well on in the morning, and as I considered that we had already spent too much time here, I was impatient to push northwards. Whilst Sverdrup and some of the others went on board to get ready for the start, the rest of us rowed south to fetch our two reindeer and our

bear. A strong breeze had begun to blow from the north-east, and as it would be hard work for us to row back against it, I had asked Sverdrup to come and meet us with the *Fram*, if the soundings permitted of his doing so. We saw quantities of seal and whitefish along

A DEAD BEAR ON REINDEER ISLAND (AUGUST 21ST, 1893).
(From a Photograph.)

the shore, but we had not time to go after them; all we wanted now was to get south, and in the first place to pick up the bear. When we came near the place where we expected to find it, we did see a large white heap resembling a bear lying on the ground, and I was sure it must be the dead one, but Henriksen maintained that it

was not. We went ashore and approached it, as it lay motionless on a grassy bank. I still felt a strong suspicion that it had already had all the shot it wanted. We drew nearer and nearer, but it gave no sign of life. I looked into Henrikson's honest face, to make sure that they were not playing a trick on me ; but he was staring

"AT FIRST WE TRIED TO DRAG THE BEAR."
(By A. Eichakke, from a Photograph.)

fixedly at the bear. As I looked two shots went off, and to my astonishment the great creature bounded into the air, still dazed with sleep. Poor beast! it was a harsh awakening. Another shot, and it fell lifeless.

We first tried to drag the bears down to the boat, but they were too heavy for us ; and we now had a hard piece of work skinning and cutting them up, and

carrying down all we wanted. But bad as it was, trudging through the soft clay with heavy quarters of bear on our backs, there was worse awaiting us on the beach. The tide had risen, and at the same time the waves had got larger and swamped the boat, and were now breaking over it. Guns and ammunition were soaking in the water; bits of bread, our only provision, floated round, and the butter dish lay at the bottom, with no butter in it. It required no small exertion to get the boat drawn up out of this heavy surf and emptied of water. Luckily, it had received no injury, as the beach was of a soft sand; but the sand had penetrated with the water everywhere, even into the most delicate parts of the locks of our rifles. But worst of all was the loss of our provisions, for now we were ravenously hungry. We had to make the best of a bad business, and eat pieces of bread soaked in sea water, and flavoured with several varieties of dirt. On this occasion, too, I lost my sketch-book, with some sketches that were of value to me.

It was no easy task to get our heavy game into the boat with these big waves breaking on the flat beach. We had to keep the boat outside the surf, and haul both skins and flesh on board with a line; a good deal of water came with them, but there was no help for it. And then we had to row north along the shore against the wind and sea as hard as we could. It was very tough work. The wind had increased, and it was all we could do to make

headway against it. Seals were diving round us, white whales coming and going, but we had no eyes for them now. Suddenly Henriksen called out that there was a bear on the point in front. I turned round, and there stood a beautiful white fellow rummaging among the flotsam on the beach. As we had no time to shoot it, we rowed on, and it went slowly in front of us northwards along the shore. At last, with great exertions we reached the bay where we were to put in for the reindeer. The bear was there before us. It had not seen the boat hitherto ; but now it got scent of us, and came nearer. It was a tempting shot. I had my finger on the trigger several times, but did not draw it. After all we had no use for the animal ; it was quite as much as we could do to stow away what we had already. It made a beautiful target of itself by getting up on a stone to have a better scent and looked about, and after a careful survey it turned round and set off inland at an easy trot.

The surf was by this time still heavier. It was a flat, shallow shore, and the waves broke a good way out from land. We rowed in till the boat touched ground and the breakers began to wash over us. The only way of getting ashore was to jump into the sea and wade. But getting the reindeer on board was another matter. There was no better landing-place farther north, and hard as it was to give up the excellent meat after all our trouble, it seemed to me there was nothing else for it, and we rowed off towards our ship.

It was the hardest row I ever had a hand in. It went pretty well to begin with; we had the current with us, and got quickly out from land; but presently the wind rose, the current slackened, and wave after wave broke over us. After incredible toil, we had at last only a short way to go. I cheered up the good fellows as best I could, reminding them of the smoking hot tea that awaited them after a few more tough pulls, and picturing all the good things in store for them. We really were all pretty well done up now, but we still took a good grip of the oars, soaking wet as we were from the sea constantly breaking over us, for of course none of us had thought of such things as oilskins in yesterday's beautiful weather. But we soon saw that with all our pulling and toiling the boat was making no headway whatever. Apart from the wind and the sea we had the current dead against us here; all our exertions were of no avail. We pulled till our finger-tips felt as if they were bursting; but the most we could manage was to keep the boat where it was; if we slackened an instant it drifted back. I tried to encourage my comrades:—"*Now* we made a little way! It was just strength that was needed!" But all to no purpose. The wind whistled round our ears, and the spray dashed over us. It was maddening to be so near the ship that it seemed as if we could almost reach out to her, and yet feel that it was impossible to get on any farther. We had to go in under the land again, where we had the current

BERNARD NORDAHL.

(From a photograph taken in December, 1893.)

with us, and here we did succeed in making a little progress. We rowed hard till we were about abreast of the ship; then we once more tried to sheer across to her, but no sooner did we get into the current again than it mercilessly drove us back. Beaten again! And again we tried the same manœuvre with the same result. Now we saw them lowering a buoy from the ship—if we could only reach it, we were saved; but we did not reach it. They were not exactly blessings that we poured on those on board. Why on earth could they not bear down to us, when they saw the straits we were in; or why, at any rate, could they not ease up the anchor, and let the ship drift a little in our direction? They saw how little was needed to enable us to reach them. Perhaps they had their reasons.

We would make one last desperate attempt. We went at it with a will. Every muscle was strained to the utmost—it was only the buoy we had to reach this time. But to our rage we now saw the buoy being hauled up. We rowed a little way on, to the windward of the *Fram*, and then tried again to sheer over. This time we got nearer her than we had ever been before; but we were disappointed in still seeing no buoy, and none was thrown over; there was not even a man to be seen on deck. We roared like madmen for a buoy—we had no strength left for another attempt. It was not a pleasing prospect to have to drift back, and go ashore again in our wet clothes;—we *would* get on board! Once more we yelled like wild Indians, and now they came

rushing aft and threw out the buoy in our direction. One more cry to my mates that we must put our last strength into the work. There were only a few boat lengths to cover, and we bent to our oars with a will. Now there were three boat lengths. Another desperate spurt. Now there were two-and-a-half boat lengths—presently two—then only one! A few more frantic pulls, and there was a little less. "Now boys, one or two more hard pulls and it's over! Hard! hard!! Keep to it! Now another! Don't give up! One more! *There we have it!!!*" And one joyful sigh of relief passed round the boat. "Keep the oars going or the rope will break. Row, boys!" And row we did, and soon they had hauled us alongside of the *Fram*. Not till we were lying there getting our bearskins and flesh hauled on board, did we really know what we had had to fight against. The current was running along the side of the ship like a rapid river. At last we were actually on board. It was evening by this time, and it was splendid to get some good hot food and then stretch one's limbs in a comfortable dry berth. There is a satisfaction in feeling that one has exerted one's self to some purpose. Here was the net result of four and twenty hours' hard toil—we had shot two reindeer, which we did not get, got two bears that we had no use for, and had totally ruined one suit of clothes. Two washings had not the smallest effect upon them, and they hung on deck to air for the rest of this trip.

I slept badly that night, for this is what I find in my diary: "Got on board after what I think was the hardest row I ever had. Slept well for a little, but am now lying tossing about in my berth, unable to sleep. Is it the coffee I drank after supper? or the cold tea I drank when I awoke with a burning thirst? I shut my eyes and try again time after time, but to no purpose. And now memory's airy visions steal softly over my soul. Gleam after gleam breaks through the mist. I see before me sunlit landscapes—smiling fields and meadows, green, leafy trees and woods, and blue mountain ridges. The singing of the steam in the boiler pipe turns to bell-ringing—church bells—ringing in Sabbath peace over Vestre-Aker on this beautiful summer morning. I am walking with father along the avenue of small birch-trees that mother planted, up towards the church which lies on the height before us, pointing up into the blue sky and sending its call far over the country-side. From up there you can see a long way. Næsodden looks quite close in the clear air, especially on an autumn morning. And we give a quiet Sunday greeting to the people that drive past us, all going our way. What a look of Sunday happiness dwells on their faces!

"I did not think it all so delightful then, and would much rather have run off to the woods with my bow and arrow after squirrels—but now—how fair, how wonderfully beautiful that sunlit picture seems to me! The

feeling of peace and happiness that even then no doubt made its impression, though only a passing one, comes back now with redoubled strength, and all nature seems one mighty, thrilling song of praise! Is it because of the contrast with this poor, barren sunless land of mists—without a tree, without a bush—nothing but stones and clay? No peace in it either—nothing but an endless struggle to get north, always north, without a moment's delay. Oh, how one yearns for a little careless happiness!"

Next day we were again ready to sail, and I tried to force the *Fram* on under steam against wind and current. But the current ran strong as a river, and we had to be specially careful with the helm, if we gave her the least thing too much, she would take a sheer, and we knew there were shallows and rocks on all sides. We kept the lead going constantly. For a time all went well, and we made way slowly, but suddenly she took a sheer and refused to obey her helm. She went off to starboard. The lead indicated shallow water. The same moment came the order, "Let go the anchor!" And to the bottom it went with a rush and a clank. There we lay with 4 fathoms of water under the stern, and 9 fathoms in front at the anchor. We were not a moment too soon. We got the *Fram's* head straight to the wind, and tried again time after time, but always with the same result. The attempt had to be given up. There was still the possibility of making our way out of the sound to leeward of the land, but the water got quickly shallow there,

and we might come on rocks at any moment. We could have gone on in front with the boat and sounded, but I had already had more than enough of rowing in that current. For the present we must stay where we were and anoint ourselves with the ointment called Patience, a medicament of which every polar expedition ought to lay in a large supply. We hoped on for a change, but the current remained as it was, and the wind certainly did not decrease. I was in despair at having to lie here for nothing but this cursed current, with open sea outside, perhaps as far as Cape Chelyuskin, that eternal cape, whose name had been sounding in my ears for the last three weeks.

When I came on deck next morning (August 23rd) winter had come. There was white snow on the deck, and on every little projection of the rigging where it had found shelter from the wind; white snow on the land, and white snow floating through the air. Oh! how the snow refreshes one's soul, and drives away all the gloom and sadness from this sullen land of fogs! Look at it scattered so delicately, as if by a loving hand, over the stones and the grass flats on shore! But wind and current are much as they were, and during the day the wind blows up to a regular storm, howling and rattling in the *Fram's* rigging.

The following day (August 24th) I had quite made up my mind that we must get out some way or other. When I came on deck in the morning the wind had gone

down considerably, and the current was not so strong. A boat would almost be able to row against it ; anyhow one could be eased away by a line from the stern, and keep on taking soundings there, while we "kedged" the *Fram* with her anchor just clear of the bottom. But before having recourse to this last expedient, I would make another attempt to go against the wind and the current. The engineers were ordered to put on as much pressure of steam as they dared, and the *Fram* was urged on at her top speed. Our surprise was not small when we saw that we were making way, and even at a tolerable rate. Soon we were out of the sound or "Knipa" (nipper) as we christened it, and could beat out to sea with steam and sail. Of course, we had, as usual, contrary wind, and thick weather. There is ample space between every little bit of sunshine in these quarters.

Next day we kept on beating northward between the edge of the ice and the land. The open channel was broad to begin with, but farther north it became so narrow that we could often see the coast when we put about at the edge of the ice. At this time we passed many unknown islands and groups of islands. There was evidently plenty of occupation here, for any one who could spare the time, in making a chart of the coast. Our voyage had another aim, and all that we could do was to make a few occasional measurements of the same nature as Nordenskiöld had made before us.

IVAR MOGSTAD.

(*From a photograph taken in 1894.*)

On August 25th, I noted in my diary that in the afternoon we had seven islands in sight. They were higher than those we had seen before, and consisted of precipitous hills. There were also small glaciers or snow-fields, and the rock formation showed clear traces of erosion by ice or snow, this being especially the case on the largest island, where there were even small valleys, partially filled with snow.

This is the record of August 26th: "Many new islands in various directions. There are here," the diary continues, "any number of unknown islands, so many that one's head gets confused in trying to keep account of them all. In the morning we passed a very rocky one, and beyond it I saw two others. After them land or islands farther to the north and still more to the north-east. We had to go out of our course in the afternoon, because we dared not pass between two large islands on account of possible shoals. The islands were round in form, like those we had seen farther back, but were of a good height. Now we held east again, with four biggish islands and two islets in the offing. On our other side we presently had a line of flat islands with steep shores. The channel was far from safe here. In the evening we suddenly noticed large stones standing up above the water among some ice-floes close on our port bow, and on our starboard beam was a shoal with stranded ice-floes. We sounded, but found over 21 fathoms of water."

I think this will suffice to give an idea of the nature of this coast. Its belt of skerries, though it certainly cannot be classed with the Norwegian one, is yet of the kind that it would be difficult to find except off glacier-formed coasts. This tends to strengthen the opinion I had formed of there having been a glacial period in the earlier history of this part of the world also. Of the coast itself, we unfortunately saw too little at any distance from which we could get an accurate idea of its formation and nature. We could not keep near land, partly because of the thick weather, and partly because of the number of islands. The little I did see was enough to give me the conviction that the actual coast line differs essentially from the one we know from maps ; it is much more winding and indented than it is shown to be. I even, several times, thought that I saw the openings into deep fjords, and more than once the suspicion occurred to me that this was a typical fjord country we were sailing past, in spite of the hills being comparatively low and rounded. In this supposition I was to be confirmed by our experiences farther north.

Our record of August 27th reads as follows: "Steamed among a variety of small islands and islets. Thick fog in the morning. At 12 noon we saw a small island right ahead, and therefore changed our course and went north. We were soon close to the ice, and after 3 in the afternoon held north-east along its edge. Sighted land when

the fog cleared a little, and were about a mile off it at 7 p.m."

It was the same striated, rounded land, covered with clay and large and small stones strewn over moss and grass flats. Before us we saw points and headlands, with islands outside, and sounds and fjords between ; but it was all locked up in ice, and we could not see far for the fog. There was that strange Arctic hush and misty light over everything—that greyish-white light caused by the reflection from the ice being cast high into the air against masses of vapour, the dark land offering a wonderful contrast. We were not sure whether this was the land near Taimur Sound, or that by Cape Palander, but were agreed that in any case it would be best to hold a northerly course, so as to keep clear of Almquist's Islands, which Nordenskiöld marks on his map as lying off Taimur Island. If we shaped our course for one watch north, or north to west, we should be safe after that, and be able again to hold farther east. But we miscalculated after all. At midnight we turned north-eastward, and at 4 a.m. (August 28th) land appeared out of the fog about half-a-mile off. It seemed to Sverdrup, who was on deck, the highest that we had seen since we left Norway. He consequently took it to be the main-land, and wished to keep well outside of it, but was obliged to turn from this course because of ice. We held to the W.S.W., and it was not till 9 a.m. that we rounded the western point of a large island, and could steer

north again. East of us were many islands or points with solid ice between them, and we followed the edge of the ice. All the morning we went north along the land against a strong current. There seemed to be no end to this land. Its discrepancy with every known map grew more and more remarkable, and I was in no slight dilemma. We had for long been far to the north of the most northern island indicated by Nordenskiöld.* My diary this day tells of great uncertainty. "This land (or these islands, or whatever it is) goes confoundedly far north. If it is a group of islands they are tolerably large ones. It has often the appearance of connected land, with fjords and points; but the weather is too thick for us to get a proper view. . . Can this that we are now coasting along be the Taimur Island of the Russian maps (or more precisely, Lapteff's map), and is it separated from the mainland by the broad strait indicated by him, whilst Nordenskiöld's Taimur Island is what Lapteff has mapped as a projecting tongue of land? This supposition would explain everything, and our observations would also fit in with it. Is it possible that Nordenskiöld found this strait, and took it for Taimur Strait, whilst in reality it was a new one; and that he

* It is true that in his account of the voyage he expressly states that the continued very thick fog "prevented us from doing more than mapping out most vaguely the islands among and past which the *Vega* sought her way."

saw Almquist's Islands, but had no suspicion that Taimur Island lay to the outside of them? The difficulty about this explanation is that the Russian maps mark no islands round Taimur Island. It is inconceivable that anyone should have travelled all about here in sledges without seeing all these small islands that lie scattered around.*

"In the afternoon, the water-gauge of the boiler got choked up; we had to stop to have it repaired, and therefore made fast to the edge of the ice. We spent the time in taking in drinking water. We found a pool on the ice, so small that we thought it would only do to begin with; but it evidently had a "subterranean" communication with other fresh water ponds on the floe. To our astonishment it proved inexhaustible, however much we scooped. In the evening we stood in to the head of an ice bay, which opened out opposite the most northern island we then had in sight. There was no passage beyond. The broken drift-ice lay packed so close in on the unbroken land-ice, that it was impossible to tell where the one ended and the other began. We could see

* Later, when I had investigated the state of matters outside Nordenskiöld's Taimur Island, it seemed to me that the same remark applied here with even better reason, as no sledge expedition could go round the coast of this island, without seeing Almquist's Islands, which lie so near, for instance, to Cape Lapteff, that they ought to be seen even in very thick weather. It would be less excusable to omit marking these islands, which are much larger, than to omit the small ones lying off the coast of the large island (or as I now consider it, group of large islands) we were at present skirting.

islands still farther to the north-east. From the atmosphere it seemed as if there might also be open water in that direction. To the north it all looked very close, but to the west there was an open waterway as far as one could see from the masthead. I was in some doubt as to what should be done. There was an open channel for a short way up past the north point of the nearest island, but farther to the east the ice seemed to be close. It might be possible to force our way through there, but it was just as likely that we should be frozen in, so I thought it more judicious to go back and make another attempt between these islands and that mainland, which I had some difficulty in believing that Sverdrup had seen in the morning."

"Thursday, August 20th. Still foggy weather. New islands were observed on the way back. Sverdrup's high land did not come to much. It turned out to be an island, and that a low one. It is wonderful the way things loom up in the fog. This reminded me of the story of the pilot at home in the Drøbak Channel. He suddenly saw land right in front, and gave the order 'Full speed astern!' Then they approached carefully and found that it was half a baling-can floating in the water."

After passing a great number of new islands, we got into open water off Taimur Island, and steamed in still weather through the sound to the north-east. At five in the afternoon I saw from the crow's-nest thick ice

BERNT BENTZEN.

(*From a photograph taken in December, 1893.*)

ahead, which blocked further progress. It stretched from Taimur Island right across to the islands south of it. On the ice, bearded seals (*phoca barbata*) were to be seen in all directions, and we saw one walrus. We approached the ice to make fast to it, but the *Fram* had got into a dead-water, and made hardly any way, in spite of the engine going full pressure. It was such slow work that I thought I would row ahead to shoot seal. In the meantime the *Fram* advanced slowly to the edge of the ice with her machinery still going at full-speed.

For the moment we had simply to give up all thoughts of getting on. It was most likely, indeed, that only a few miles of solid ice lay between us and the probably open Taimur Sea; but to break through this ice was an impossibility. It was too thick, and there were no openings in it. Nordenskiöld had steamed through here earlier in the year (August 18th, 1878) without the slightest hindrance,* and here, perhaps, our hopes, for this year at any rate, were to be wrecked. It was not possible that the ice should melt before winter set in in earnest. The only thing to save us would be a proper

* In his account of his voyage Nordenskiöld writes as follows of the condition of this channel: "We were met by only small quantities of that sort of ice which has a layer of fresh-water ice on the top of the salt, and we noticed that it was all melting fjord or river ice. I hardly think that we came all day on a single piece of ice big enough to have cut up a seal upon."

storm from the south-west. Our other slight hope lay in the possibility that Nordenskiöld's Taimur Sound farther south might be open, and that we might manage to get the *Fram* through there, in spite of Nordenskiöld having said distinctly "that it is too shallow to allow of the passage of vessels of any size."

After having been out in the kayak and boat and shot some seals, we went on to anchor in a bay that lay rather farther south, where it seemed as if there would be a little shelter in case of a storm. We wanted now to have a thorough cleaning out of the boiler, a very necessary operation. It took us more than one watch to steam a distance we could have rowed in half an hour or less. We could hardly get on at all for the dead-water, and we swept the whole sea along with us. It is a peculiar phenomenon, this dead-water. We had at present a better opportunity of studying it than we desired. It occurs where a surface layer of fresh water rests upon the salt water of the sea, and this fresh water is carried along with the ship, gliding on the heavier sea beneath as if on a fixed foundation. The difference between the two strata was in this case so great that while we had drinking water on the surface the water we got from the bottom cock of the engine-room was far too salt to be used for the boiler. Dead-water manifests itself in the form of larger or smaller ripples or waves stretching across the wake, the one behind the other, arising sometimes as far forward as

almost amidships. We made loops in our course, turned sometimes right round, tried all sorts of antics to get clear of it, but to very little purpose. The moment the engine stopped it seemed as if the ship were sucked back. In spite of the *Fram's* weight, and the momentum she usually has, we could in the present instance go at full speed till within a fathom or two of the edge of the ice, and hardly feel a shock when she touched.

Just as we were approaching we saw a fox jumping backwards and forwards on the ice, taking the most wonderful leaps, and enjoying life. Sverdrup sent a ball from the forecastle which put an end to it on the spot.

About midday two bears were seen on land, but they disappeared before we got in to shoot them.

The number of seals to be seen in every direction was something extraordinary, and it seemed to me that this would be an uncommonly good hunting ground. The flocks I saw this first day on the ice reminded me of the crested-seal hunting grounds on the west coast of Greenland.

This experience of ours may appear to contrast strangely with that of the *Vega* Expedition. Nordenskiöld writes of this sea, comparing it with the sea to the north and east of Spitzbergen :—"Another striking difference is the scarcity of warm-blooded animals in this region as yet unvisited by the hunter. We had not seen a single bird in the whole course of the day, a thing that had never before happened to

me on a summer voyage in the Arctic regions; and we had hardly seen a seal." The fact that they had not seen a seal is simply enough explained by the absence of ice. From my impression of it, the region must, on the contrary, abound in seals. Nordenskiöld himself says that "numbers of seals, both *phoca barbata* and *phoca hispida*, were to be seen" on the ice in Taimur Straits.

So this was all the progress we had made up to the end of August. On August 18th, 1878, Nordenskiöld had passed through this sound, and on the 19th and 20th passed Cape Chelyuskin, but here was an impenetrable mass of ice frozen on to the land lying in our way at the end of the month. The prospect was anything but cheering. Were the many prophets of evil—there is never any scarcity of *them*—to prove right even at this early stage of the undertaking? No! The Taimur Strait must be attempted, and should this attempt fail, another last one should be made outside all the islands again. Possibly the ice masses out there might in the meantime have drifted and left an open way. We could not stop here.

September came in with a still, melancholy snowfall; and this desolate land with its low, rounded heights, soon lay under a deep covering. It did not add to our cheerfulness to see winter thus gently and noiselessly ushered in after an all too short summer.

On September 2nd the boiler was ready at last, was filled with fresh water from the sea surface, and we pre-

WE LAY IN OPEN WATER.

(From a photograph.)

pared to start. While this preparation was going on, Sverdrup and I went ashore to have a look after reindeer. The snow was lying thick, and if it had not been so wet we could have used our snow-shoes. As it was, we tramped about in the heavy slush without them, and without seeing so much as the track of a beast of any kind. A forlorn land, indeed! Most of the birds of passage had already taken their way south; we had met small flocks of them at sea. They were collecting for the great flight to the sunshine, and we poor souls could not help wishing that it were possible to send news and greeting with them. A few solitary Arctic and ordinary gulls were our only company now. One day I found a belated straggler of a goose sitting on the edge of the ice.

We steamed south in the evening, but still followed by the dead water. According to Nordenskiöld's map, it was only about 20 miles to Taimur Strait, but we were the whole night doing this distance. Our speed was reduced to about a fifth part of what it would otherwise have been. At 6 a.m. (September 3rd) we got in among some thin ice that scraped the dead water off us. The change was noticeable at once. As the *Fram* cut into the ice crust she gave a sort of spring forward, and, after this, went on at her ordinary speed; and henceforth we had very little more trouble with dead water.

We found what, according to the map, was Taimur Strait, entirely blocked with ice, and we held farther

south, to see if we could not come upon some other strait or passage. It was not an easy matter, finding our way by the map. We had not seen Hovgaard's Islands, marked as lying north of the entrance to Taimur Strait; yet the weather was so beautifully clear, that it seemed unlikely they could have escaped us, if they lay where Nordenskiöld's sketch-map places them. On the other hand, we saw several islands in the offing. These, however, lay so far out that it is not probable that Nordenskiöld saw them, as the weather was thick when he was here; and, besides, it is impossible that islands lying many miles out at sea could have been mapped as close to land, with only a narrow sound separating them from it. Farther south we found a narrow open strait or fjord, which we steamed into, in order if possible to get some better idea of the lie of the land. I sat up in the crow's-nest, hoping for a general clearing up of matters; but the prospect of this seemed to recede farther and farther. What we now had to the north of us, and what I had taken to be a projection of the mainland, proved to be an island; but the fjord wound on farther inland. Now it got narrower—presently it widened out again. The mystery thickened. Could this be Taimur Strait after all? A dead calm on the sea. Fog everywhere over the land. It was well nigh impossible to distinguish the smooth surface of the water from the ice, and the ice from the snow-covered land. Everything is so strangely still and dead. The sea rises

and falls with each twist of the fjord through the silent land of mists. Now we have open water ahead, now more ice, and it is impossible to make sure which it is. *Is* this Taimur Strait? Are we getting through? A whole year is at stake! . . . No! here we stop—nothing but ice ahead. No! it is only smooth water with the snowy land reflected in it. This *must* be Taimur Strait!

But now we had several large ice-floes ahead, and it was difficult to get on; so we anchored at a point, in a good, safe harbour, to make a closer inspection. We now discovered that it was a strong tidal current that was carrying the ice-floes with it; and there could be no doubt that it was a strait we were lying in. I rowed out in the evening to shoot some seals, taking for the purpose my most precious weapon, a double-barrelled Express rifle, calibre ·577. As we were in the act of taking a sealskin on board, the boat heeled over, I slipped and my rifle fell into the sea—a sad accident. Peter Henriksen and Bentzen, who were rowing me, took it so to heart that they could not speak for some time. They declared that it would never do to leave the valuable gun lying there in 5 fathoms of water. So we rowed to the *Fram* for the necessary apparatus, and dragged the spot for several hours, well on into the dark, gloomy night. While we were thus employed, a bearded seal circled round and round us, bobbing up its big startled face, now on one side of us, now on the other,

and always coming nearer; it was evidently anxious to find out what our night work might be. Then it dived over and over again, probably to see how the dragging was getting on. Was it afraid of our finding the rifle? At last it became too intrusive. I took Peter's rifle, and put a ball through its head; but it sank before we could reach it; and we gave up the whole business in despair. The loss of that rifle saved the life of many a seal; and, alas! it had cost me £28.

We took the boat again next day and rowed eastward, to find out if there really was a passage for us through this strait. It had turned cold during the night, and snow had fallen, so the sea round the *Fram* was covered with tolerably thick snow ice, and it cost us a good deal of exertion to break through it into open water with the boat. I thought it possible that the land farther in on the north side of the strait might be that in the neighbourhood of Actinia Bay, where the *Vega* had lain; but I sought in vain for the cairn erected there by Nordenskiöld, and presently discovered to my astonishment that it was only a small island, and that this island lay on the south side of the principal entrance to Taimur Strait. The strait was very broad here, and I felt pretty certain that I saw where the real Actinia Bay cut into the land far to the north.

We were hungry now, and were preparing to take a meal before we rowed on from the island, when we discovered to our disappointment that the butter had

been forgotten. We crammed down the dry biscuits as best we could, and worked our jaws till they were stiff on the pieces we managed to hack off a hard dried reindeer chine. When we were tired of eating, though anything but satisfied, we set off, giving this point the name of "Cape Butterless." We rowed far in through the strait, and it seemed to us to be a good passage for ships, 8 or 9 fathoms right up to the shore. However, we were stopped by ice in the evening, and as we ran the risk of being frozen in if we pushed on any farther, I thought it best to turn. We certainly ran no danger of starving, for we saw fresh tracks both of bears and reindeer everywhere, and there were plenty of seals in the water; but I was afraid of delaying the *Fram* in view of the possibility of progress in another direction. So we toiled back against a strong wind, not reaching the ship till next morning; and this was none too early, for presently we were in the midst of a storm.

On the subject of the navigability of Taimur Strait, Nordenskiöld writes that, "according to soundings made by Lieutenant Palander, it is obstructed by rocky shallows; and being also full of strong currents, it is hardly advisable to sail through it, at least until the direction of these currents has been carefully investigated." I have nothing particular to add to this, except that, as already mentioned, the channel was clear as far as we penetrated, and had the appearance of being practicable as far as I could see. I was, therefore,

determined that we would, if necessary, try to force our way through with the *Fram*.

The 5th of September brought snow with a stiff breeze, which steadily grew stronger. When it was rattling in the rigging in the evening we congratulated each other on being safe on board—it would not have been an easy matter to row back to-day. But altogether I was dissatisfied. There was some chance, indeed, that this wind might loosen the ice farther north, and yesterday's experiences had given me the hope of being able, in case of necessity, to force a way through this strait; but now the wind was steadily driving larger masses of ice in past us; and this approach of winter was alarming—it might quite well be on us in earnest before any channel was opened. I tried to reconcile myself to the idea of wintering in our present surroundings. I had already laid all the plans for the way in which we were to occupy ourselves during the coming year. Besides an investigation of this coast, which offered problems enough to solve, we were to explore the unknown interior of the Taimur Peninsula right across to the mouth of the Chatanga. With our dogs and snow-shoes we should be able to go far and wide; so the year would not be a lost one as regarded geography and geology. But no! I could not reconcile myself to it! I could not! A year of one's life was a year; and our expedition promised to be a long one at best. What tormented me most was the reflection that if the ice stopped us now, we could have no

LARS PETTERSEN.

(From a photograph taken in 1895.)

assurance that it would not do the same at the same time next year. It has been observed so often that several bad ice-years come together, and this was evidently none of the best. Though I would hardly confess the feeling of depression even to myself, I must say that it was not on a bed of roses I lay these nights, until sleep came and carried me off into the land of forgetfulness.

Wednesday, the 6th of September, was the anniversary of my wedding-day. I was superstitious enough to feel when I awoke in the morning, that this day would bring a change, if one were coming at all. The storm had gone down a little, the sun peeped out, and life seemed brighter. The wind quieted down altogether in the course of the afternoon, the weather becoming calm and beautiful. The strait to the north of us, which was blocked before with solid ice, had been swept open by the storm ; but the strait to the east, where we had been with the boat, was firmly blocked, and if we had not turned when we did that evening, we should have been there yet, and for no one knows how long. It seemed to us not improbable that the ice between Cape Lapteff and Almquist's Islands might be broken up. We, therefore, got up steam and set off north about 6.30 p.m. to try our fortune once more. I felt quite sure that the day would bring us luck. The weather was still beautiful, and we were thoroughly enjoying the sunshine. It was such an unusual thing that Nordahl, when he was working among the coals in the hold in the after-

noon, mistook a sunbeam falling through the hatch on the coal dust for a plank, and leaned hard on it. He was not a little surprised when he fell right through it on to some iron lumber.

It became more and more difficult to make anything of the land, and our observation for latitude at noon did not help to clear up matters. It placed us at 76° 2′ north latitude, or about 14 miles from what is marked as the mainland on Nordenskiöld's or Bove's map. It was hardly to be expected that these should be correct, as the weather seems to have been foggy the whole time the explorers were here.

Nor were we successful in finding Hovgaard's Islands as we sailed north. When I supposed that we were off them, just on the north side of the entrance to Taimur Strait, I saw, to my surprise, a high mountain almost directly north of us, which seemed as if it must be on the mainland. What could be the explanation of this? I began to have a growing suspicion that this was a regular labyrinth of islands we had got into. We were hoping to investigate and clear up the matter, when thick weather, with sleet and rain, most inconveniently came on, and we had to leave this problem for the future to solve.

The mist was thick, and soon the darkness of night was added to it, so that we could not see land at any great distance. It might seem rather risky to push ahead now, but it was an opportunity not to be lost. We slackened speed a little, and kept on along the coast

all night, in readiness to turn as soon as land was observed ahead. Satisfied that things were in good hands, as it was Sverdrup's watch, I lay down in my berth with a lighter mind than I had had for long.

At 6 o'clock next morning (September 7th) Sverdrup roused me with the information that we had passed Taimur Island, or Cape Lapteff, at 3 a.m., and were now at Taimur Bay, but with close ice and an island ahead. It was possible that we might reach the island, as a channel had just opened through the ice in that direction; but we were at present in a tearing "whirlpool" current, and should be obliged to put back for the moment. After breakfast I went up into the crow's nest. It was brilliant sunshine. I found that Sverdrup's island must be mainland, which, however, stretched remarkably far west compared with that given on the maps. I could still see Taimur Island behind me, and the most easterly of Almquist's Islands lay gleaming in the sun to the north. It was a long sandy point that we had ahead, and I could follow the land in a southerly direction till it disappeared on the horizon at the head of the bay in the south. Then there was a small strip where no land, only open water, could be made out. After that the land emerged on the west side of the bay, stretching towards Taimur Island. With its heights and round knolls this land was essentially different from the low coast on the east side of the bay.

To the north of the point ahead of us I saw open

water; there was some ice between us and it, but the *Fram* forced her way through. When we got out, right off the point, I was surprised to notice the sea suddenly covered with brown clayey water. It could not be a deep layer, for the track we left behind was quite clear. The clayey water seemed to be skimmed to either side by the passage of the ship. I ordered soundings to be taken, and found, as I expected, shallower water—first 8 fathoms, then $6\frac{1}{2}$, then $5\frac{1}{2}$. I stopped now, and backed. Things looked very suspicious, and round us ice-floes lay stranded. There was also a very strong current running north-east. Constantly sounding, we again went slowly forwards. Fortunately the lead went on showing 5 fathoms. Presently we got into deeper water—6 fathoms, then $6\frac{1}{2}$—and now we went on at full speed again. We were soon out into the clear, blue water on the other side. There was quite a sharp boundary line between the brown surface water and the clear blue. The muddy water evidently came from some river a little farther south.

From this point the land trended back in an easterly direction, and we held east and north-east in the open water between it and the ice. In the afternoon this channel grew very narrow, and we got right under the coast, where it again slopes north. We kept close along it in a very narrow cut, with a depth of 6 to 8 fathoms, but in the evening had to stop, as the ice lay packed close in to the shore ahead of us.

This land we had been coasting along bore a strong resemblance to Yalmal. The same low plains, rising very little above the sea, and not visible at any great distance. It was perhaps rather more undulating. At one or two places I even saw some ridges of a certain elevation a little way inland. The shore the whole way seemed to be formed of strata of sand and clay, the margin sloping steeply to the sea.

Many reindeer herds were to be seen on the plains, and next morning (September 8th) I went on shore on a hunting expedition. Having shot one reindeer, I was on my way farther inland in search of more, when I made a surprising discovery, which attracted all my attention, and made me quite forget the errand I had come on. It was a large fjord cutting its way in through the land to the north of me. I went as far as possible to find out all I could about it, but did not manage to see the end of it. So far as I *could* see, it was a fine broad sheet of water, stretching eastwards to some blue mountains far, far inland, which, at the extreme limit of my vision, seemed to slope down to the water. Beyond them I could distinguish nothing. My imagination was fired, and for a moment it seemed to me as if this might almost be a strait, stretching right across the land here, and making an island of the Chelyuskin Peninsula. But probably it was only a river, which widened out near its mouth into a broad lake, as several of the Siberian rivers do. All about the clay plains I was tramping over, enormous

erratic blocks, of various formations, lay scattered. They can only have been brought here by the great glaciers of the Ice Age. There was not much life to be seen. Besides reindeer there were just a few willow-grouse, snow-buntings, and snipe ; and I saw tracks of foxes and lemmings. This farthest north part of Siberia is quite uninhabited, and has probably not been visited even by the wandering nomads. However, I saw a circular moss heap on a plain far inland, which looked as if it might be the work of man's hand. Perhaps, after all, some Samoyede had been here collecting moss for his reindeer ; but it must have been long ago ; for the moss looked quite black and rotten. The heap was quite possibly only one of Nature's freaks—she is often capricious.

What a constant alternation of light and shadow there is in this Arctic land. When I went up to the crow's-nest next morning (September 9th), I saw that the ice to the north had loosened from the land, and I could trace a channel which might lead us northwards into open water. I at once gave the order to get up steam. The barometer was certainly low—lower than we had ever had it yet ; it was down to 733 mm. (28·8 inches) ; the wind was blowing in heavy squalls off the land, and in on the plains the gusts were whirling up clouds of sand and dust.

Sverdrup thought it would be safer to stay where we were ; but it would be too annoying to miss this splendid opportunity : and the sunshine was so beautiful, and the sky so smiling and reassuring. I gave orders to set sail,

ANTON AMUNDSEN.

(*From a photograph taken in December, 1893.*)

and soon we were pushing on northwards through the ice, under steam, and with every stitch of canvas that we could crowd on. Cape Chelyuskin must be vanquished! Never had the *Fram* gone so fast; she made more than 8 knots by the log; it seemed as though she knew how much depended on her getting on. Soon we were through the ice, and had open water along the land as far as the eye could reach. We passed point after point, discovering new fjords and islands on the way, and soon I thought that I caught a glimpse through the large telescope of some mountains far away north; they must be in the neighbourhood of Cape Chelyuskin itself.

The land along which we to-day coasted to the northward was quite low, some of it like what I had seen on shore the previous day. At some distance from the low coast, fairly high mountains or mountain chains were to be seen. Some of them seemed to consist of horizontal sedimentary schist; they were flat-topped, with precipitous sides. Further inland the mountains were all white with snow. At one point it seemed as if the whole range were covered with a sheet of ice, or great snow field that spread itself down the sides. At the edge of this sheet I could see projecting masses of rock, but all the inner part was spotless white. It seemed almost too continuous and even to be new snow, and looked like a permanent snow mantle.

Nordenskiöld's map marks at this place, "high mountain chains inland;" and this agrees with our observa-

tions, though I cannot assert that the mountains are of any considerable height. But when, in agreement with earlier maps, he marks at the same place, "high rocky coast;" his terms are open to objection. The coast is, as already mentioned, quite low, and consists, in great part at least, of layers of clay or loose earth. Nordenskiöld either took this last description from the earlier, unreliable maps, or possibly allowed himself to be misled by the fog which beset them during their voyage in these waters.

In the evening we were approaching the north end of the land, but the current, which we had had with us earlier in the day, was now against us, and it seemed as if we were never to get past an island that lay off the shore to the north of us. The mountain height which I had seen at an earlier hour through the telescope, lay here some way inland. It was flat on the top with precipitous sides, like those mountains last described. It seemed to be sandstone or basaltic rock; only the horizontal strata of the ledges on its sides were not visible. I calculated its height at 1,000 to 1,500 feet. Out at sea we saw several new islands, the nearest of them being of some size.

The moment seemed to be at hand, when we were at last to round that point which had haunted us for so long—the second of the greatest difficulties I expected to have to overcome on this expedition. I sat up in the crow's-nest in the evening, looking out to the north.

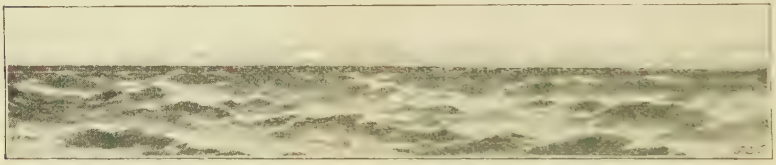
The land was low and desolate. The sun had long since gone down behind the sea, and the dreamy evening sky was yellow and gold. It was lonely and still up here, high above the water. Only one star was to be seen. It stood straight above Cape Chelyuskin, shining clearly and sadly in the pale sky. As we sailed on and got the cape more to the east of us, the star went with it; it was always there, straight above. I could not help sitting watching it. It seemed to have some charm for me, and to bring such peace. Was it my star? Was it the spirit of home following and smiling to me now? Many a thought it brought to me, as the *Fram* toiled on through the melancholy night, past the northernmost point of the old world.

Towards morning we were off what we took to be actually the northern extremity. We stood in near land, and at the change of the watch, exactly at four o'clock, our flags were hoisted, and our three last cartridges sent a thundering salute over the sea. Almost at the same moment the sun rose. Then our poetic doctor burst forth into the following touching lines:—

> "Up go the flags, off goes the gun;
> The clock strikes four—and lo, the sun!"

As the sun rose, the Chelyuskin troll, that had so long had us in his power, was banned. We had escaped the

danger of a winter's imprisonment on this coast, and we saw the way clear to our goal, the drift ice to the north of the New Siberian Islands. In honour of the occasion, all hands were turned out, and punch, fruit, and cigars were served in the festally lighted saloon. Something special in the way of a toast was expected on such an occasion. I lifted my glass, and made the following speech :—" Skoal, my lads, and be glad we've passed Chelyuskin !" Then there was some organ playing, during which I went up into the crow's-nest again, to have a last look at the land. I now saw that the height I



CAPE CHELYUSKIN, THE NORTHERNMOST POINT OF THE OLD WORLD.

had noticed in the evening, which has already been described, lies on the west side of the peninsula, while farther east a lower and more rounded height stretches southward. This last must be the one mentioned by Nordenskiöld, and, according to his description, the real north point must lie out beyond it ; so that we were now off King Oscar's Bay ; but I looked in vain through the telescope for Nordenskiöld's cairn. I had the greatest inclination to land, but did not think that we could spare the time. The bay, which was clear of ice at the time of

the *Vega's* visit, was now closed in with thick winter ice, frozen fast to the land.

We had an open channel before us; but we could see the edge of the drift-ice out at sea. A little farther west we passed a couple of small islands, lying a short way

ON LAND EAST OF CAPE CHELYUSKIN (SEPTEMBER 10TH, 1893).

(By Otto Sinding, from a Photograph.)

from the coast. We had to stop before noon at the north-western corner of Chelyuskin, on account of the drift-ice, which seemed to reach right into the land before us. To judge by the dark air, there was open water again on the other side of an island which lay

ahead. We landed and made sure that some straits or fjords on the inside of this island to the south were quite closed with firm ice; and in the evening the *Fram* forced her way through the drift-ice on the outside of it. We steamed and sailed southwards along the coast all night, making splendid way; when the wind was blowing stiffest we went at the rate of 9 knots. We came upon ice every now and then, but got through it easily.

Towards morning (September 11th) we had high land ahead, and had to change our course to due east, keeping to this all day. When I came on deck before noon I saw a fine tract of hill country with high summits and valleys between. It was the first view of the sort since we had left Vardö, and after the monotonous low land we had been coasting along for months, it was refreshing to see such mountains again. They ended with a precipitous descent to the east, and eastward from that extended a perfectly flat plain. In the course of the day we quite lost sight of land, and strangely enough did not see it again; nor did we see the Islands of St. Peter and St. Paul, though, according to the maps, our course lay close past them.

Thursday, September 12th. Henriksen awoke me this morning at six with the information that there were several walruses lying on a floe quite close to us. "By jove!" Up I jumped and had my clothes on in a trice. It was a lovely morning—fine, still weather; the walruses' guffaw sounded over to us along the clear

ice surface. They were lying crowded together on a floe a little to landward from us, blue mountains glittering behind them in the sun. At last the harpoons were sharpened, guns and cartridges ready, and Henriksen, Juell and I set off. There seemed to be a slight breeze from the south, so we rowed to the north side of the floe, to get to leeward of the animals. From time to time their sentry raised his head, but apparently did not see us. We advanced slowly, and soon were so near that we had to row very cautiously. Juell kept us going, while Henriksen was ready in the bow with a harpoon, and I behind him with a gun. The moment the sentry raised his head the oars stopped, and we stood motionless; when he sunk it again, a few more strokes brought us nearer.

Body to body they lay close-packed on a small floe, old and young ones mixed. Enormous masses of flesh they were! Now and again one of the ladies fanned herself by moving one of her flappers backwards and forwards over her body; then she lay quiet again on her back or side. "Good gracious! what a lot of meat!" said Juell, who was cook. More and more cautiously we drew near. Whilst I sat ready with the gun, Henriksen took a good grip of the harpoon shaft, and as the boat touched the floe he rose, and off flew the harpoon. But it struck too high, glanced off the tough hide, and skipped over the backs of the animals. Now there was a pretty to do! Ten or twelve great weird faces glared upon us at once; the colossal creatures twisted

themselves round with incredible celerity, and came waddling with lifted heads and hollow bellowings to the edge of the ice where we lay. It was undeniably an imposing sight; but I laid my gun to my shoulder and fired at one of the biggest heads. The animal staggered, and then fell head foremost into the water. Now a ball into another head; this creature fell too, but was able to fling itself into the sea. And now the whole flock dashed in, and we as well as they were hidden in spray. It had all happened in a few seconds. But up they came again immediately round the boat, the one head bigger and uglier than the other—their young ones close beside them. They stood up in the water, bellowed and roared till the air trembled, threw themselves forward towards us, then rose up again, and new bellowings filled the air. Then they rolled over and disappeared with a splash, then bobbed up again. The water foamed and boiled for yards around—the ice-world that had been so still before seemed in a moment to have been transformed into a raging Bedlam. Any moment we might expect to have a walrus tusk or two through the boat, or to be heaved up and capsized. Something of this kind was the very least that could happen after such a terrible commotion. But the hurly-burly went on and nothing came of it. I again picked out my victims. They went on bellowing and grunting like the others, but with blood streaming from their mouths and noses. Another ball, and one tumbled over and floated on the

A WARM CORNER AMONG THE WALRUSES, OFF EAST TAIMYR.

(By Otto Sinding.)

water; now a ball to the second, and it did the same. Henriksen was ready with the harpoons, and secured them both. One more was shot, but we had no more harpoons, and had to strike a seal-hook into it to hold it up. The hook slipped, however, and the animal sank before we could save it. Whilst we were towing our booty to an ice-floe, we were still, for part of the time at least, surrounded by walruses; but there was no use in shooting any more, for we had no means of carrying them off. The *Fram* presently came up and took our two on board, and we were soon going ahead along the coast. We saw many walruses in this part. We shot two others in the afternoon, and could have got many more if we had had time to spare. It was in this same neighbourhood that Nordenskiöld also saw one or two small herds.

We now continued our course, against a strong current, southwards along the coast, past the mouth of the Chatanga. This eastern part of the Taimur Peninsula is a comparatively high, mountainous region, but with a lower level stretch between the mountains and the sea—apparently the same kind of low land we had seen along the coast almost the whole way. As the sea seemed to be tolerably open and free from ice, we made several attempts to shorten our course by leaving the coast and striking across for the mouth of the Olenek; but every time thick ice drove us back to our channel by the land.

On September 14th we were off the land lying between the Chatanga and the Anabara. This also was fairly high mountainous country with a low strip by the sea. "In this respect," so I write in my diary, "this whole coast reminds one very much of Jæderen in Norway. But the mountains here are not so well separated and are considerably lower than those farther north. The sea is unpleasantly shallow; at one time during the night we had only 4 fathoms, and were obliged to put back some distance. We have ice outside, quite close; but yet there is a sufficient fairway to let us push on eastwards."

The following day we got into good, open water, but shallow—never more than 6 to 7 fathoms. We heard the roaring of waves to the east, so there must certainly be open water in that direction, which indeed we had expected. It was plain that the Lena, with its masses of warm water, was beginning to assert its influence. The sea here was browner, and showed signs of some mixture of muddy river-water. It was also much less salt.

"It would be foolish," I write in my diary for this day (September 15th), "to go in to the Olenek now that we are so late. Even if there were no danger from shoals, it would cost us too much time—probably a year. Besides it is by no means sure that the *Fram* can get in there at all; it would be a very tiresome business if she went aground in these waters. No doubt we should be very much the better for a few more dogs, but to lose a year is too much; we shall rather head straight east for

FLAYING WALRUSES

(By Otto Sinding, from a photograph.)

the New Siberian Islands, now that there is a good opportunity, and really bright prospects.

"The ice here puzzles me a good deal. How in the world is it not swept northwards by the current which, according to my calculations, ought to set north from this coast, and which indeed we ourselves have felt. And it is such hard, thick ice—has the appearance of being several years old. Does it come from the eastward, or does it lie and grind round here in the sea between the 'north-going' current of the Lena and the Taimur Peninsula? I cannot tell yet, but anyhow it is different from the thin one-year-old ice we have seen until now in the Kara Sea and west of Cape Chelyuskin.

"Saturday, September 16th. We are keeping a north-westerly course (by compass) through open water, and have got pretty well north, but see no ice, and the air is dark to the northward. Mild weather and water comparatively warm, as high as 35° Fahr. We have the current against us, and are always considerably west of our reckoning. Several flocks of eider-duck were seen in the course of the day. We ought to have land to the north of us; can it be that which is keeping back the ice?"

Next day we met ice, and had to hold a little to the south to keep clear of it; and I began to fear that we should not be able to get as far as I had hoped. But in my notes for the following day (Monday, September 18th) I read: "A splendid day. Shaped our course northwards,

to the west of Bielkoff Island. Open sea; good wind from the west; good progress. Weather clear, and we had a little sunshine in the afternoon. Now the decisive moment approaches. At 12.15 shaped our course north to east (by compass). Now it is to be proved if my theory, on which the whole expedition is based, is correct —if we are to find a little north from here a north-flowing current. So far everything is better than I had expected. We are in latitude 75½° N., and have still open water and dark sky to the north and west. In the evening there was ice-light ahead and on the starboard bow. About seven I thought that I could see ice, which, however, rose so regularly that it more resembled land, but it was too dark to see distinctly. It seemed as if it might be Bielkoff Island, and a big light spot farther to the east might even be the reflection from the snow-covered Kotelnoi. I should have liked to run in here, partly to see a little of this interesting island, and partly to inspect the stores which we knew had been deposited for us here by the friendly care of Baron von Toll; but time was precious, and to the north the sea seemed to lie open to us. Prospects were bright, and we sailed steadily northwards, wondering what the morrow would bring. Disappointment or hope? If all went well we should reach Sannikoff Land—that, as yet, untrodden ground.

"It was a strange feeling to be sailing away north in the dark night to unknown lands, over an open, rolling sea, where no ship, no boat had been before. We might

have been hundreds of miles away in more southerly waters, the air was so mild for September in this latitude.

"Tuesday, September 19th. I have never had such a splendid sail. On to the north, steadily north, with a good wind, as fast as steam and sail can take us, and open sea mile after mile, watch after watch, through these unknown regions, always clearer and clearer of ice one might almost say! How long will this last? The eye always turns to the northward as one paces the bridge. It is gazing into the future. But there is always the same dark sky ahead, which means open sea. My plan was standing its test. It seemed as if luck had been on our side ever since the 6th of September. We see 'nothing but clean water,' as Henriksen answered from the crow's-nest when I called up to him. When he was standing at the wheel later in the morning, and I was on the bridge, he suddenly said: 'They little think at home in Norway just now that we are sailing straight for the Pole in clear water.' 'No, they don't believe we have got so far.' And I shouldn't have believed it myself if anyone had prophesied it to me a fortnight ago; but true it is. All my reflections and inferences on the subject had led me to expect open water for a good way farther north; but it is seldom that one's inspirations turn out to be so correct. No ice-light in any direction, not even now in the evening. We saw no land the whole day; but we had fog and thick weather all the

morning and forenoon, so that we were still going at half speed, as we were afraid of coming suddenly on something. Now we are almost in 77° north latitude. How long is it to go on? I have said all along that I should be glad if we reached 78°; but Sverdrup is less easily satisfied; he says over 80°—perhaps 84°, 85°. He even talks seriously of the open Polar Sea, which he once read about; he always comes back upon it, in spite of my laughing at him.

"I have almost to ask myself if this is not a dream. One must have gone against the stream to know what it means to go with the stream. As it was on the Greenland Expedition, so it is here:—

"'Dort ward der Traum zur Wirklichkeit,
Hier wird die Wirklichkeit zum Traum!'

"Hardly any life visible here. Saw an auk or black guillemot to-day, and later a sea-gull in the distance. When I was hauling up a bucket of water in the evening to wash the deck, I noticed that it was sparkling with phosphorescence. One could almost have imagined one's self to be in the south.

"Wednesday, September 20th. I have had a rough awakening from my dream. As I was sitting at 11 a.m. looking at the map and thinking that my cup would soon be full—we had almost reached 78°—there was a sudden luff, and I rushed out. Ahead of us lay the

edge of the ice, long and compact, shining through the fog. I had a strong inclination to go eastward, on the possibility of there being land in that direction; but it looked as if the ice extended farther south there, and there was the probability of being able to reach a higher latitude if we kept west; so we headed that way. The sun broke through for a moment just now, so we took an observation, which showed us to be in about 77° 44′ north latitude."

We now held north-west along the edge of the ice. It seemed to me as if there might be land at no great distance, we saw such a remarkable number of birds of various kinds. A flock of snipe or wading birds met us, followed us for a time, and then took their way south. They were probably on their passage from some land to the north of us. We could see nothing, as the fog lay persistently over the ice. Again, later, we saw flocks of small snipe, indicating the possible proximity of land. Next day the weather was clearer, but still there was no land in sight. We were now a good way north of the spot where Baron von Toll has mapped the south coast of Sannikoff Land, but in about the same longitude. So it is probably only a small island, and in any case cannot extend far north.

On September 21st we had thick fog again, and when we had sailed north to the head of a bay in the ice, and could get no farther, I decided to wait here for clear weather to see if progress farther north were possible.

I calculated that we were now in about 78½° north latitude. We tried several times during the day to take soundings, but did not succeed in reaching the bottom with 215 fathoms of line.

"To-day made the agreeable discovery that there are bugs on board. Must plan a campaign against them.

"Friday, September 22nd. Brilliant sunshine once again, and white dazzling ice ahead. First we lay still in the fog because we could not see which way to go; now it is clear and we know just as little about it. It looks as if we were at the northern boundary of the open water. To the west the ice appears to extend south again. To the north it is compact and white—only a small open rift or pool every here and there; and the sky is whitish-blue everywhere on the horizon. It is from the east we have just come, but there we could see very little; and for want of anything better to do, we shall make a short excursion in that direction, on the possibility of finding openings in the ice. If there were only time, what I should like would be to go east as far as Sannikoff Island, or, better still, all the way to Bennet Land, to see what condition things are in there; but it is too late now. The sea will soon be freezing, and we should run a great risk of being frozen in at a disadvantageous point."

Earlier Arctic explorers have considered it a necessity to keep near some coast. But this was exactly what I wanted to avoid. It was the drift of the ice that I

wished to get into, and what I most feared was being blocked by land. It seemed as if we might do much worse than give ourselves up to the ice where we were, especially as our excursion to the east had proved that following the ice-edge in that direction would soon force us south again. So in the meantime we made fast to a great ice-block, and prepared to clean the boiler and shift coals. "We are lying in open water, with only a few large floes here and there; but I have a presentiment that this is our winter harbour.

"Great bug war to-day. We play the big steam hose on mattresses, sofa-cushions—everything that we think can possibly harbour the enemies. All clothes are put into a barrel, which is hermetically closed, except where the hose is introduced. Then full steam is set on. It whizzes and whistles inside, and a little forces its way through the joints, and we think that the animals must be having a fine hot time of it. But suddenly the barrel cracks, the steam rushes out, and the lid bursts off with a violent explosion, and is flung far along the deck. I still hope that there has been a great slaughter, for these are horrible enemies. Juell tried the old experiment of setting one on a piece of wood to see if it would creep north. It would not move at all, so he took a blubber hook and hit it to make it go; but it would do nothing but wriggle its head—the harder he hit the more it wriggled. 'Squash it, then,' said Bentzen. And squashed it was.

"Friday, September 23rd. We are still at the same moorings, working at the coal. An unpleasant contrast, —everything on board, men and dogs included, black and filthy, and everything around white and bright in beautiful sunshine. It looks as if more ice were driving in.

"Sunday, September 24th. Still coal shifting. Fog

THE ICE INTO WHICH THE "FRAM" WAS FROZEN (SEPTEMBER 25TH, 1893).
(From a Photograph.)

in the morning, which cleared off as the day went on, when we discovered that we were closely surrounded on all sides by tolerably thick ice. Between the floes lies slush-ice, which will soon be quite firm. There is an open pool to be seen to the north, but not a large one. From the crow's-nest, with the telescope, we can still descry the sea across the ice to the south.

It looks as if we were being shut in. Well, we must e'en bid the ice welcome. A dead region this; no life in any direction, except a single seal (*phoca fœtida*) in the water; and on the floe beside us we can see a bear-track some days old. We again try to get soundings, but still find no bottom; it is remarkable that there should be such depth here."

Ugh! one can hardly imagine a dirtier, nastier job than a spell of coal-shifting on board. It is a pity that such a useful thing as coal should be so black! What we are doing now is only hoisting it from the hold, and filling the bunkers with it; but every man on board must help, and everything is in a mess. So many men must stand on the coal heap in the hold and fill the buckets, and so many hoist them. Jacobsen is specially good at this last job; his strong arms pull up bucket after bucket as if they were as many boxes of matches. The rest of us go backwards and forwards with the buckets between the main-hatch and the half-deck, pouring the coal into the bunkers; and down below stands Amundsen packing it, as black as he can be. Of course coal-dust is flying over the whole deck; the dogs creep into corners, black and tousled; and we ourselves—well, we don't wear our best clothes on such days. We got some amusement out of the remarkable appearance of our faces, with their dark complexions, black streaks at the most unlikely places, and eyes and white teeth shining through the dirt. Anyone happening

to touch the white wall below with his hand leaves a black five-fingered blot ; and the doors have a wealth of such mementoes. The seats of the sofas must have their wrong sides turned up, else they would bear lasting marks of another part of the body ; and the tablecloth – well, we fortunately do not possess such a thing. In short, coal-shifting is as dirty and wretched an experience as one can well imagine in these bright and pure surroundings. One good thing is that there is plenty of fresh water to wash with ; we can find it in every hollow on the floes, so there is some hope of our being clean again in time, and it is possible that this may be our last coal-shifting.

"Monday, September 25th. Frozen in faster and faster! Beautiful still weather ; 13 degrees of frost last night. Winter is coming now. Had a visit from a bear, which was off again before anyone got a shot at it."

CHAPTER VI.

The Winter Night.

It really looked as if we were now frozen in for good and I did not expect to get the *Fram* out of the ice till we were on the other side of the Pole, nearing the Atlantic Ocean. Autumn was already well advanced; the sun stood lower in the heavens day by day; and the temperature sank steadily. The long night of winter was approaching—that dreaded night. There was nothing to be done except prepare ourselves for it, and by degrees we converted our ship, as well as we could, into comfortable winter quarters; while at the same time we took every precaution to assure her against the destructive influences of cold, drift-ice, and the other forces of nature to which it was prophesied that we must succumb. The rudder was hauled up, so that it might not be destroyed by the pressure of the ice. We had intended to do the same with the screw; but as it, with its iron case, would certainly help to strengthen the stern, and especially the rudder stock, we let it remain in its place. We had a good deal of work with the engine,

too ; each separate part was taken out, oiled, and laid away for the winter ; slide-valves, pistons, shafts, were examined and thoroughly cleaned. All this was done with the very greatest care. Amundsen looked after that engine as if it had been his own child ; late and early he was down tending it lovingly ; and we used to tease him about it, to see the defiant look come into his eyes and hear him say : "It's all very well for you to talk, but there's not such another engine in the world, and it would be a sin and a shame not to take good care of it." Assuredly he left nothing undone. I do not suppose a day passed, winter or summer, all these three years, that he did not go down and caress it, and do something or other for it.

We cleared up in the hold to make room for a joiner's workshop down there ; our mechanical workshop we had in the engine-room. The smithy was at first on deck, and afterwards on the ice ; tinsmith's work was done chiefly in the chart room, shoemaker's and sailmaker's, and various odd sorts of work, in the saloon. And all these occupations were carried on with interest and activity during the rest of the expedition. There was nothing, from the most delicate instruments down to wooden shoes and axe-handles, that could not be made on board the *Fram*. When we were found to be short of sounding-line, a grand rope-walk was constructed on the ice. It proved to be a very profitable undertaking, and was well patronised.

Henriksen. Pettersen. Sverdrup. Bentzen.

THE SMITHY ON BOARD THE FRAM.

(From a photograph.)

Presently we began putting up the windmill which was to drive the dynamo and produce the electric light. While the ship was going, the dynamo was driven by the engine, but for a long time past we had had to be contented with petroleum lamps in our dark cabins. The windmill was erected on the port side of the fore-deck, between the main hatch and the rail. It took several weeks to get this important appliance into working order.

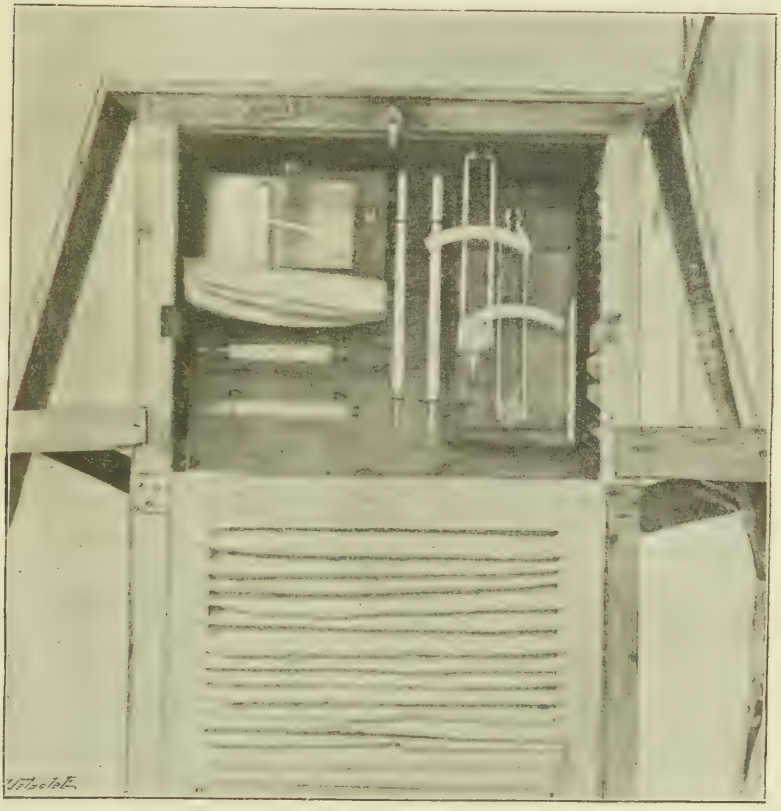
As mentioned on page 72, we had also brought with us a "horse-mill" for driving the dynamo. I had thought that it might be of service in giving us exercise whenever there was no other physical work for us. But this time never came, and so the "horse-mill" was never used. There was always something to occupy us; and it was not difficult to find work for each man that gave him sufficient exercise, and so much distraction that the time did not seem to him unbearably long.

There was the care of the ship and rigging, the inspection of sails, ropes, etc., etc.; there were provisions of all kinds to be got out from the cases down in the hold, and handed over to the cook; there was ice —good, pure, fresh-water ice—to be found and carried to the galley to be melted for cooking, drinking and washing-water. Then, as already mentioned, there was always something doing in the various workshops. Now "Smith Lars" had to straighten the longboat davits which had been twisted by the waves in the Kara Sea; now it was a hook, a knife, a bear-trap, or some-

thing else to be forged. The tinsmith, again "Smith Lars," had to solder together a great tin pail for the ice-melting in the galley. The mechanician, Amundsen, would have an order for some instrument or other —perhaps a new current-gauge. The watchmaker, Mogstad, would have a thermograph to examine and clean, or a new spring to put into a watch. The sail-maker might have an order for a quantity of dog harness. Then each man had to be his own shoemaker —make himself canvas boots with thick, warm, wooden soles, according to Sverdrup's newest pattern. Presently there would come an order to mechanician Amundsen for a supply of new zinc music-sheets for the organ— these being a brand-new invention of the leader of the expedition. The electrician would have to examine and clean the accumulator batteries, which were in danger of freezing. When at last the windmill was ready, it had to be attended to, turned according to the wind, etc. And when the wind was too strong, some one had to climb up and reef the mill sails, which was not a pleasant occupation in this winter cold, and involved much breathing on fingers and rubbing of the tip of the nose.

It happened now and then, too, that the ship required to be pumped. This became less and less necessary as the water froze round her and in the interstices in her sides. The pumps, therefore, were not touched from December, 1893, till July, 1895. The only noticeable leakage during that time was in the engine-room; but it was

nothing of any consequence; just a few buckets of ice that had to be hewn away every month from the bottom of the ship and hoisted up.



From a] THE THERMOMETER HOUSE. *[Photograph.*

To these varied employments was presently added, as the most important of all, the taking of scientific observations, which gave many of us constant occu-

pation. Those that involved the greatest labour were, of course, the meteorological observations, which were taken every four hours day and night; indeed, for a considerable part of the time, every two hours. They kept one man, sometimes two, at work all day. It was Hansen who had the principal charge of this department, and his regular assistant until March, 1895, was Johansen, whose place was then taken by Nordahl. The night observations were taken by whoever was on watch. About every second day when the weather was clear, Hansen and his assistant took the astronomical observation which ascertained our position. This was certainly the work which was followed with most interest by all the members of the expedition; and it was not uncommon to see Hansen's cabin, while he was making his calculations, besieged with idle spectators, waiting to hear the result—whether we had drifted north or south since the last observation, and how far. The state of feeling on board very much depended on these results.

Hansen had also at stated periods to take observations to determine the magnetic constant in this unknown region. These were carried on at first in a tent, specially constructed for the purpose, which was soon erected on the ice; but later we built him a large snow hut, as being both more suitable and more comfortable.

For the ship's doctor there was less occupation. He looked long and vainly for patients, and at last had to

MAGNETIC OBSERVATIONS.

(From a photograph.)

give it up and in despair take to doctoring the dogs. Once a month he too had to make his scientific observations, which consisted in the weighing of each man, and the counting of blood corpuscles, and estimating the amount of blood pigment, in order to ascertain the number of red blood corpuscles and the quantity of red colouring matter (hæmoglobin) in the blood of each. This was also work that was watched with anxious interest, as every man thought he could tell from the result obtained how long it would be before scurvy overtook him.

Among our scientific pursuits may also be mentioned the determining of the temperature of the water and of its degree of saltness at varying depths; the collection and examination of such animals as are to be found in these northern seas; the ascertaining of the amount of electricity in the air; the observation of the formation of the ice, its growth and thickness, and of the temperature of the different layers of ice; the investigation of the currents in the water under it, etc., etc. I had the main charge of this department. There remains to be mentioned the regular observation of the aurora borealis, which we had a splendid opportunity of studying. After I had gone on with it for some time, Blessing undertook this part of my duties; and when I left the ship, I made over to him all the other observations that were under my charge. Not an inconsiderable item of our scientific work were the

soundings and dredgings. At the greater depths, it was such an undertaking that every one had to assist; and from the way we were obliged to do it later, one sounding sometimes gave occupation for several days.

One day differed very little from another on board, and the description of one is, in every particular of any importance, a description of all.

We all turned out at eight, and breakfasted on hard bread (both rye and wheat), cheese (Dutch clove cheese, Cheddar, Gruyère, and Mysost, or goat's-whey cheese, prepared from dry powder), corned beef or corned mutton, luncheon ham or Chicago tinned tongue or bacon, cod-caviare, anchovy roe; also oatmeal biscuits or English ship-biscuits—with orange marmalade or Frame Food jelly. Three times a week we had fresh-baked bread as well, and often cake of some kind. As for our beverages we began by having coffee and chocolate day about; but afterwards had coffee only two days a week, tea two, and chocolate three.

After breakfast some men went to attend to the dogs —give them their food, which consisted of half a stock-fish or a couple of dog biscuits each; let them loose; or do whatever else there was to do for them. The others went all to their different tasks. Each took his turn of a week in the galley—helping the cook to wash up, lay the table, and wait. The cook himself had to arrange his bill of fare for dinner immediately after breakfast, and to set about his preparations at once. Some of us would

take a turn on the floe to get some fresh air, and to examine the state of the ice, its pressure, etc. At one o'clock all were assembled for dinner, which generally consisted of three courses—soup, meat, and dessert; or, soup, fish, and meat; or fish, meat, and dessert; or sometimes only fish and meat. With the meat we always had potatoes and either green vegetables or maccaroni. I think we were all agreed that the fare was good; it would hardly have been better at home; for some of us it would perhaps have been worse. And we looked like fatted pigs; one or two even began to cultivate a double chin and a corporation. As a rule, stories and jokes circulated at table along with the bock-beer.

After dinner the smokers of our company would march off, well fed and contented, into the galley, which was smoking-room as well as kitchen, tobacco being tabooed in the cabins except on festive occasions. Out there they had a good smoke and chat; many a story was told, and not seldom some warm dispute arose. Afterwards came, for most of us, a short siesta. Then each went to his work again until we were summoned to supper at six o'clock, when the regulation day's work was done. Supper was almost the same as breakfast, except that tea was always the beverage. Afterwards there was again smoking in the galley, while the saloon was transformed into a silent reading-room. Good use was made of the valuable library presented to the expedition by

generous publishers and other friends. If the kind donors could have seen us away up there, sitting round the table at night with heads buried in books or collections of illustrations, and could have understood how invaluable these companions were to us, they would have felt

HENRIKSEN. SVERDRUP. BLESSING.

A SMOKE IN THE GALLEY OF THE "FRAM."

rewarded by the knowledge that they had conferred a real boon —that they had materially assisted in making the *Fram* the little oasis that it was in this vast ice desert. About half-past seven or eight cards or other games were brought out, and we played well on into the

SCOTT-HANSEN AND JOHANSEN INSPECTING THE BAROMETERS.

(From a photograph.)

night, seated in groups round the saloon table. One or other of us might go to the organ, and with the assistance of the crank handle, perform some of our beautiful pieces, or Johansen would bring out the accordion and play many a fine tune. His crowning efforts were "Oh, Susanna!" and "Napoleon's March across the Alps in an Open Boat." About midnight we turned in, and then the night

"THE SALOON WAS CONVERTED INTO A READING-ROOM."

watch was set. Each man went on for an hour. Their most trying work on watch seems to have been writing their diaries and looking out, when the dogs barked, for any signs of bears at hand. Besides this, every two

hours or four hours, the watch had to go aloft or on to the ice to take the meteorological observations.

I believe I may safely say that on the whole the time passed pleasantly and imperceptibly, and that we throve in virtue of the regular habits imposed upon us.

My notes from day to day will give the best idea of our life, in all its monotony. They are not great events that are here recorded, but in their very bareness they give a true picture. Such, and no other, was our life. I shall give some quotations direct from my diary :—

"Tuesday, September 26th. Beautiful weather. The sun stands much lower now; it was 9° above the horizon at midday. Winter is rapidly approaching; there are $14\frac{1}{2}°$ of frost this evening, but we do not feel it cold. To-day's observations unfortunately show no particular drift northwards; according to them we are still in 78° 50′ north latitude. I wandered about over the floe towards evening. Nothing more wonderfully beautiful can exist than the Arctic night. It is dreamland, painted in the imagination's most delicate tints; it is colour etherealised. One shade melts into the other, so that you cannot tell where one ends and the other begins, and yet they are all there. No forms—it is all faint, dreamy colour music, a far-away, long-drawn-out melody on muted strings. Is not all life's beauty high, and delicate, and pure like this night? Give it brighter colours, and it is no longer so beautiful. The sky is like

an enormous cupola, blue at the zenith, shading down into green, and then into lilac and violet at the edges. Over the ice-fields there are cold violet-blue shadows, with lighter pink tints where a ridge here and there catches the last reflection of the vanished day. Up in the blue of the cupola shine the stars, speaking peace, as they always do, those unchanging friends. In the south stands a large red-yellow moon, encircled by a yellow ring and light golden clouds floating on the blue background. Presently the aurora borealis shakes over the vault of heaven its veil of glittering silver—changing now to yellow, now to green, now to red. It spreads, it contracts again, in restless change, next it breaks into waving, many-folded bands of shining silver, over which shoot billows of glittering rays; and then the glory vanishes. Presently it shimmers in tongues of flame over the very zenith; and then again it shoots a bright ray right up from the horizon, until the whole melts away in the moonlight, and it is as though one heard the sigh of a departing spirit. Here and there are left a few waving streamers of light, vague as a foreboding—they are the dust from the aurora's glittering cloak. But now it is growing again; new lightnings shoot up; and the endless game begins afresh. And all the time this utter stillness, impressive as the symphony of infinitude. I have never been able to grasp the fact that this earth will some day be spent and desolate and empty. To what end, in that case, all this beauty, with not a crea-

ture to rejoice in it? Now I begin to divine it. *This* is the coming earth—here are beauty and death. But to what purpose? Ah, what is the purpose of all these spheres? Read the answer if you can in the starry blue firmament.

"Wednesday, September 27th. Grey weather and strong wind from the south-south-west. Nordahl, who is cook to-day, had to haul up some salt meat which, rolled in a sack, had been steeping for two days in the sea. As soon as he got hold of it he called out, horrified, that it was crawling with animals. He let go the sack, and jumped away from it, the animals scattering round in every direction. They proved to be sand-hoppers, or *amphipodæ*, which had eaten their way into the meat. There were pints of them, both inside and outside of the sack. A pleasant discovery; there will be no need to starve when such food is to be had by hanging a sack in the water.

"Bentzen is the wag of the party; he is always playing some practical joke. Just now one of the men came rushing up and stood respectfully waiting for me to speak to him. It was Bentzen that had told him I wanted him. It won't be long before he has thought of some new trick.

"Thursday, September 28th. Snowfall with wind. To-day the dogs' hour of release has come. Until now their life on board has been really a melancholy one. They have been tied up ever since we left Khabarova.

The stormy seas have broken over them, and they have been rolled here and there in the water on the deck; they have half hanged themselves in their leashes, howling miserably; they have had the hose played over them every time the deck was washed; they have been sea-sick; in bad as in good weather they have had to lie on the spot hard fate had chained them to, without more exercise than going backwards and forwards the length of their chains. It is thus you are treated, you splendid animals, who are to be our stay in the hour of need! When that time comes, you will, for a while at least, have the place of honour. When they were let loose there was a perfect storm of jubilation. They rolled in the snow, washed and rubbed themselves, and rushed about the ice in wild joy, barking loudly. Our floe, a short time ago so lonesome and forlorn, was quite a cheerful sight with this sudden population; the silence of ages was broken."

It was our intention after this to tie up the dogs on the ice.

"Friday, September 29th. Dr. Blessing's birthday, in honour of which we of course had a fête, our first great one on board. There was a double occasion for it. Our midday observation showed us to be in latitude 79° 5′ north; so we had passed one more degree. We had no fewer than five courses at dinner, and a more than usually elaborate concert during the meal. Here follows a copy of the printed menu:

"'FRAM.'

"MENU. SEPTEMBER 29TH, 1893.

Soupe à la julienne avec des macaroni-dumplings.
Potage de poison (*sic*) avec des pommes de terre.
Pudding de Nordahl.
Glacé du Greenland.
De la table bière de la Ringnæes.
Marmalade intacte.

"MUSIC À DINÉ (*sic*).

1. Valse Myosotic.
2. Menuette de Don Juan de Mozart.
3. Les Troubadours.
4. College Hornpipe.
5. Die letzte Rose de Martha.
6. Ein flotter Studio Marsch de Phil. Farbach.
7. Valse de Lagune de Strauss.
8. Le Chanson du Nord (Du gamla, du friska. . . .
9. Hoch Habsburg Marsch de Kral.
10. Josse Karads Polska.
11. Vårt Land, vårt Land.
12. Le Chanson de Chaseuse.
13. Les Roses, Valse de Métra.
14. Fischers Hornpipe.
15. Traum-Valse de Millocher.
16. Hemlandssång. 'A le misérable.'
17. Diamanten und Perlen.
18. Marsch de 'Det lustiga Kriget.'
19. Valse de 'Det lustige Kriget.'
20. Prière du Freischütz."

DR. BLESSING IN HIS CABIN.

I hope my readers will admit that this was quite a fine entertainment to be given in latitude 79° north; but of such we had many on board the *Fram* at still higher latitudes.

"Coffee and sweets were served after dinner; and after a better supper than usual, came strawberry and lemon ice (*alias* granitta) and limejuice toddy, without alcohol. The health of the hero of the day was first proposed 'in a few well-chosen words;' and then we drank a bumper to the seventy-ninth degree, which we were sure was only the first of many degrees to be conquered in the same way.

"Saturday, September 30th. I am not satisfied that the *Fram's* present position is a good one for the winter. The great floe on the port side to which we are moored sends out an ugly projection about amidships, which might give her a bad squeeze in case of the ice packing. We therefore began to-day to warp her backwards into better ice. It is by no means quick work. The comparatively open channel around us is now covered with tolerably thick ice, which has to be hewn and broken in pieces with axes, ice-staves, and walrus-spears. Then the capstan is manned, and we heave her through the broken floe foot by foot. The temperature this evening is 9·4° Fahr. (−12·6° C.). A wonderful sunset."

"Sunday, October 1st. Wind from the W.S.W. and weather mild. We are taking a day of rest, which means eating, sleeping, smoking, and reading.

"Monday, October 2nd. Warped the ship farther astern, until we found a good berth for her out in the middle of the newly-frozen pool. On the port side we have our big floe, with the dogs' camp—thirty-five black dogs tied up on the white ice. This floe turns a low, and by no means threatening, edge towards us. We have good low ice on the starboard too; and between the ship and the floes we have on both sides the newly-frozen surface ice, which has, in the process of warping, also got packed in under the ship's bottom, so that she lies in a good bed.

"As Sverdrup, Juell, and I were sitting in the chart-room in the afternoon splicing rope for the sounding-line, Peter* rushed in shouting, 'A bear! a bear!' I snatched up my rifle, and tore out. 'Where is it?' 'There, near the tent, on the starboard side; it came right up to it, and had almost got hold of them.'

"And there it was, big and yellow, snuffing away at the tent gear. Hansen, Blessing, and Johansen were running at the top of their speed towards the ship. On to the ice I jumped, and off I went, broke through, stumbled, fell, and up again. The bear in the meantime had done sniffing, and had probably determined that an iron spade, an ice-staff, an axe, some tent-pegs, and a canvas tent were too indigestible food even for a bear's stomach. Anyhow it was following with mighty strides in the track

* Peter Henriksen.

I LET LOOSE SOME OF THE DOGS.

of the fugitives. It caught sight of me, and stopped astonished, as if it were thinking, 'What sort of insect can *that* be?' I went on to within easy range; it stood still, looking hard at me. At last it turned its head a little, and I gave it a ball in the neck. Without moving a limb, it sank slowly to the ice. I now let loose some of the dogs, to accustom them to this sort of sport, but they showed a lamentable want of interest in it; and 'Kvik,' on whom all our hope in the matter of bear-hunting rested, bristled up and approached the dead animal very slowly and carefully, with her tail between her legs—a sorry spectacle.

"I must now give the story of the others who made the bear's acquaintance first. Hansen had to-day begun to set up his observatory tent a little ahead of the ship on the starboard bow. In the afternoon he got Blessing and Johansen to help him. While they were hard at work they caught sight of a bear not far from them, just off the bow of the *Fram*.

"'Hush! Keep quiet, in case we frighten him,' says Hansen.

"'Yes, yes!' And they crouch together and look at him.

"'I think I'd better try to slip on board and announce him,' says Blessing.

"'I think you should,' says Hansen.

"And off steals Blessing on tiptoe, so as not to frighten the bear. By this time Bruin has seen and scented

them, and comes jogging along, following his nose, towards them.

"Hansen now began to get over his fear of startling him. The bear caught sight of Blessing slinking off to the ship, and set after him. Blessing also was now much less concerned than he had been as to the bear's nerves. He stopped uncertain what to do; but a moment's reflection brought him to the conclusion that it was pleasanter to be three than one just then, and he went back to the others faster than he had gone from them. The bear followed at a good rate. Hansen did not like the look of things, and thought the time had come to try a dodge he had seen recommended in a book. He raised himself to his full height, flung his arms about, and yelled with all the power of his lungs, ably assisted by the others. But the bear came on quite undisturbed. The situation was becoming critical. Each snatched up his weapon—Hansen an ice-staff, Johansen an axe, and Blessing nothing. They screamed with all their strength, 'Bear! bear!' and set off for the ship as hard as they could tear. But the bear held on his steady course to the tent, and examined everything there before (as we have seen) he went after them.

"It was a lean he-bear. The only thing that was found in its stomach when it was opened was a piece of paper, with the names 'Lütken and Mohn.' This was the wrapping paper of a 'ski' light, and had been left by one of us somewhere on the ice. After this day

THE MEN WHO WERE AFRAID OF FRIGHTENING THE BEAR.

"OFF STEALS BLESSING ON TIP-TOE."

(Drawn by A. Bloch.)

some of the members of the expedition would hardly leave the ship without being armed to the teeth."

"Wednesday, October 4th. North-westerly wind yesterday and to-day. Yesterday we had — 16° (3° F.), and to-day — 14° C. (7° F.). I have worked all day at soundings and got to about 800 fathoms depth. The bottom samples consisted of a layer of grey clay 4 to $4\frac{1}{4}$ inches thick, and below that brown clay or mud. The temperature was, strangely enough, just above freezing point (+ 0·18° C.) at the bottom, and just below freezing point (— 0·4° C.) 75 fathoms up. This rather disposes of the story of a shallow polar basin, and of the extreme coldness of the water of the Arctic Ocean.

"While we were hauling up the line in the afternoon, the ice cracked a little astern of the *Fram*, and the crack increased in breadth so quickly, that three of us, who had to go out to save the ice-anchors, were obliged to make a bridge over it with a long board to get back to the ship again. Later in the evening there was some packing in the ice, and several new passages opened out behind this first one.

"Thursday, October 5th. As I was dressing this morning, just before breakfast, the mate rushed down to tell me a bear was in sight. I was soon on deck and saw him coming from the south, to the lee of us. He was still a good way off, but stopped and looked about. Presently he lay down, and Henriksen and I started off across the ice, and were lucky enough to

send a bullet into his breast at about 350 yards, just as he was moving off.

"We are making everything snug for the winter and for the ice pressure. This afternoon we took up the rudder. Beautiful weather, but cold, — 18° C. (— 0·4° F.) at 8 p.m. The result of the medical inspection to-day was the discovery that we still have bugs on board; and I do not know what we are to do. We have no steam now, and must fix our hopes on the cold.

"I must confess that this discovery made me feel quite ill. If bugs got into our winter furs the thing was hopeless. So the next day there was a regular feast of purification, according to the most rigid antiseptic prescriptions. Each man had to deliver up his old clothes, every stitch of them, wash himself, and dress in new ones from top to toe. All the old clothes, fur rugs, and such things, were carefully carried up on to the deck, and kept there the whole winter. This was more than even these animals could stand; — 53° C. (— 63° F.) of cold proved to be too much for them, and we saw no more of them. As the bug is made to say in the popular rhyme :—

> 'Put me in the boiling pot, and shut me down tight;
> But don't leave me out on a cold winter night!'

"Friday, October 6th. Cold, down to 11° below zero (Fahr.). To-day we have begun to rig up the windmill. The ice has been packing to the north of the *Fram's* stern. As the dogs will freeze if they are kept tied up

and get no exercise, we let them loose this afternoon, and are going to try if we can leave them so. Of course they at once began to fight, and some poor creatures limped away from the battle-field scratched and torn. But otherwise great joy prevailed; they leaped, and ran, and rolled themselves in the snow. Brilliant aurora in the evening.

"Saturday, October 7th. Still cold, with the same northerly wind we have had all these last days. I am afraid we are drifting far south now. A few days ago we were, according to the observations, in 78° 47′ north latitude. That was 16′ south in less than a week. This is too much; but we must make it up again: we *must* get north. It means going away from home now, but soon it will mean going nearer home. What depth of beauty, with an undercurrent of endless sadness, there is in these dreamily glowing evenings! The vanished sun has left its track of melancholy flame. Nature's music, which fills all space, is instinct with sorrow that all this beauty should be spread out day after day, week after week, year after year, over a dead world. Why? Sunsets are always sad, at home too. This thought makes the sight seem doubly precious here and doubly sad. There is red burning blood in the west against the cold snow—and to think that this is the sea, stiffened in chains, in death, and that the sun will soon leave us, and we shall be in the dark, alone! 'And the earth was without form, and void'; is this the sea that is to come?

"Sunday, October 8th. Beautiful weather. Made a snow-shoe expedition westward, all the dogs following. The running was a little spoiled by the brine, which soaks up through the snow from the surface of the ice—flat, newly frozen ice, with older, uneven blocks breaking through it. I seated myself on a snow hummock far away out; the dogs crowded round to be patted. My eye wandered over the great snow plain, endless and solitary, nothing but snow, snow everywhere.

"The observations to-day gave us an unpleasant surprise; we are now down in 78° 35′ north latitude; but there is a simple enough explanation of this, when one thinks of all the northerly and north-westerly wind we have had lately, with open water not far to the south of us. As soon as everything is frozen we must go north again: there can be no question of that; but none the less this state of matters is unpleasant. I find some comfort in the fact that we have also drifted a little east, so that at all events we have kept with the wind and are not drifting down westward.

"Monday, October 9th. I was feverish both during last night and to-day. Goodness knows what is the meaning of such nonsense. When I was taking water samples in the morning I discovered that the water-lifter suddenly stopped at the depth of a little less than 80 fathoms. It was really the bottom. So we have drifted south again to the shallow water. We let the weight lie at the bottom for a little, and saw by the line

that for the moment we were drifting north. This was some small comfort anyhow.

"All at once in the afternoon, as we were sitting idly chatting, a deafening noise began, and the whole ship shook. This was the first ice-pressure. Every one rushed on deck to look. The *Fram* behaved beautifully, as I had expected she would. On pushed the ice with steady pressure, but down under us it had to go, and we were slowly lifted up. These 'squeezings' continued off and on all the afternoon, and were sometimes so strong that the *Fram* was lifted several feet; but then the ice could no longer bear her, and she broke it below her. Towards evening the whole slackened again, till we lay in a good-sized piece of open water, and had hurriedly to moor her to our old floe, or we should have drifted off. There seems to be a good deal of movement in the ice here. Peter has just been telling us that he hears the dull booming of strong pressures not far off.

"Tuesday, October 10th. The ice continues disturbed.

"Wednesday, October 11th. The bad news was brought this afternoon that 'Job' is dead, torn in pieces by the other dogs. He was found a good way from the ship, 'Old Suggen' lying watching the corpse, so that no other dog could get to it. They are wretches, these dogs; no day passes without a fight. In the day-time one of us is generally at hand to stop it, but at night

they seldom fail to tear and bite one of their comrades. Poor 'Barabbas' is almost frightened out of his wits. He stays on board now, and dares not venture on the ice, because he knows the other monsters would set on him. There is not a trace of chivalry about these curs. When there is a fight, the whole pack rush like wild

DOGS CHAINED ON THE ICE.

beasts on the loser. But is it not, perhaps, the law of nature that the strong, and not the weak, should be protected? Have not we human beings, perhaps, been trying to turn nature topsy-turvy by protecting and doing our best to keep life in all the weak?

"The ice is restless, and has pressed a good deal

to-day again. It begins with a gentle crack and moan along the side of the ship, which gradually sounds louder in every key. Now it is a high plaintive tone, now it is a grumble, now it is a snarl, and the ship gives a start up. The noise steadily grows till it is like all the pipes of an organ ; the ship trembles and shakes, and rises by fits and starts, or is sometimes gently lifted. There is a pleasant, comfortable feeling in sitting listening to all this uproar and knowing the strength of our ship. Many a one would have been crushed long ago. But outside the ice is ground against our ship's sides, the piles of broken-up floe are forced under her heavy, invulnerable hull, and we lie as if in a bed. Soon the noise begins to die down ; the ship sinks into its old position again, and presently all is silent as before. In several places round us the ice is piled up, at one spot to a considerable height. Towards evening there was a slackening, and we lay again in a large, open pool.

" Thursday, October 12th. In the morning we and our floe were drifting on blue water in the middle of a large, open lane, which stretched far to the north, and in the north the atmosphere at the horizon was dark and blue. As far as we could see from the crow's-nest with the small field-glass, there was no end to the open water, with only single pieces of ice sticking up in it here and there. These are extraordinary changes. I wondered if we should prepare to go ahead. But they had long ago taken the machinery to pieces for the winter,

so that it would be a matter of time to get it ready for use again. Perhaps it would be best to wait a little. Clear weather, with sunshine—a beautiful, inspiriting winter day—but the same northerly wind. Took soundings and found 50 fathoms of water (90 metres). We are drifting slowly southwards. Towards evening the ice packed together again with much force; but the *Fram* can hold her own. In the afternoon I fished in a depth of about 27 fathoms (50 metres) with Murray's silk-net,* and had a good take, especially of small crustaceans (*kopepodæ*, *ostrakodæ*, *amphipodæ*, etc.) and of a little Arctic worm (*spadella*) that swims about in the sea. It is horribly difficult to manage a little fishing here. No sooner have you found an opening to slip your tackle through, than it begins to close again, and you have to haul up as hard as you can, so as not to get the line nipped and lose everything. It is a pity, for there are interesting hauls to be made. One sees phosphorescence† in the water here whenever there is the smallest opening in the ice. There is by no means such a scarcity of animal life as one might expect.

* This silk bag-net is intended to be dragged after a boat or ship to catch the living animals or plant organisms at various depths. We used them constantly during our drifting, sinking them to different depths under the ice, and they often brought up rich spoils.

† This phosphorescence is principally due to small luminous crustacea (*kopepodæ*).

"Friday, October 13th. Now we are in the very midst of what the prophets would have had us dread so much. The ice is pressing and packing round us with a noise like thunder. It is piling itself up into long walls, and heaps high enough to reach a good way up the *Fram's* rigging; in fact, it is trying its very utmost to grind the *Fram* into powder. But here we sit quite tranquil, not even going up to look at all the hurly-burly, but just chatting and laughing, as usual. Last night there was tremendous pressure round our old dog-floe. The ice had towered up higher than the highest point of the floe, and hustled down upon it. It had quite spoilt a well, where we till now had found good drinking water, filling it with brine. Furthermore, it had cast itself over our stern ice-anchor and part of the steel cable which held it, burying them so effectually that we had afterwards to cut the cable. Then it covered our planks and sledges, which stood on the ice. Before long the dogs were in danger, and the watch had to turn out all hands to save them. At last the floe split in two. This morning the ice was one scene of melancholy confusion, gleaming in the most glorious sunshine. Piled up all round us were high, steep ice walls. Strangely enough, we had lain on the very verge of the worst confusion, and had escaped with the loss of an ice-anchor, a piece of steel cable, a few planks and other bits of wood, and half of a Samoyede sledge, all of which might have been saved if we had looked after them in time.

But the men have grown so indifferent to the pressure now, that they do not even go up to look, let it thunder ever so hard. They feel that the ship can stand it, and so long as that is the case there is nothing to hurt except the ice itself.

"In the morning the pressure slackened again, and we were soon lying in a large piece of open water, as we did yesterday. To-day, again, this stretched far away towards the northern horizon, where the same dark atmosphere indicated some extent of open water. I now gave the order to put the engine together again; they told me it could be done in a day and a half or at most two days. We must go north and see what there is up there. I think it possible that it may be the boundary between the ice-drift the *Jeannette* was in and the pack we are now drifting south with—or can it be land?

"We had kept company quite long enough with the old, now broken-up floe, so worked ourselves a little way astern after dinner, as the ice was beginning to draw together. Towards evening the pressure began again in earnest, and was especially bad round the remains of our old floe, so that I believe we may congratulate ourselves on having left it. It is evident that the pressure here stands in connection with, is perhaps caused by, the tidal wave. It occurs with the greatest regularity. The ice slackens twice and packs twice in 24 hours. The pressure has happened about 4, 5, and 6 o'clock in the morning, and almost at exactly the same hour in the

afternoon, and in between we have always lain for some part of the time in open water. The very great pressure just now is probably due to the spring tide ; we had new moon on the 9th, which was the first day of the pressure. Then it was just after midday when we noticed it, but it has been later every day, and now it is at 8 p.m."

The theory of the ice-pressure being caused to a considerable extent by the tidal wave has been advanced repeatedly by Arctic explorers. During the *Fram's* drifting we had better opportunity than most of them to study this phenomenon, and our experience seems to leave no doubt that over a wide region the tide produces movement and pressure of the ice. It occurs especially at the time of the spring tides, and more at new moon than at full moon. During the intervening periods there was as a rule little or no trace of pressure. But these tidal pressures did not occur during the whole time of our drifting. We noticed them especially the first autumn, while we were in the neighbourhood of the open sea north of Siberia, and the last year, when the *Fram* was drawing near the open Atlantic Ocean ; they were less noticeable while we were in the polar basin. Pressure occurs here more irregularly, and is mainly caused by the wind driving the ice. When one pictures to one's self these enormous ice-masses, drifting in a certain direction, suddenly meeting hindrances—for example, ice-masses drifting from the opposite direction, owing to a change

of wind in some more or less distant quarter—it is easy to understand the tremendous pressure that must result.

Such an ice conflict is undeniably a stupendous spectacle. One feels one's self to be in the presence of Titanic forces, and it is easy to understand how timid souls may be overawed and feel as if nothing could stand before it. For when the packing begins in earnest, it seems as though there could be no spot on the earth's surface left unshaken. First you hear a sound like the thundering rumble of an earthquake far away on the great waste; then you hear it in several places, always coming nearer and nearer. The silent ice world re-echoes with thunders; nature's giants are awakening to the battle. The ice cracks on every side of you, and begins to pile itself up; and all of a sudden you too find yourself in the midst of the struggle. There are howlings and thunderings round you; you feel the ice trembling, and hear it rumbling under your feet; there is no peace anywhere. In the semi-darkness you can see it piling and tossing itself up into high ridges nearer and nearer you—floes 10, 12, 15 feet thick, broken, and flung on the top of each other as if they were featherweights. They are quite near you now, and you jump away to save your life. But the ice splits in front of you, a black gulf opens, and water streams up. You turn in another direction, but there through the dark you can just see a new ridge of moving ice-blocks coming towards you. You try another direction, but there it is the same. All round there is

thundering and roaring, as of some enormous waterfall, with explosions like cannon salvoes. Still nearer you it comes. The floe you are standing on gets smaller and smaller; water pours over it; there can be no escape except by scrambling over the rolling ice-blocks to get to the other side of the pack. But now the disturbance begins to calm down. The noise passes on, and is lost by degrees in the distance.

This is what goes on away there in the north month after month and year after year. The ice is split and piled up into mounds, which extend in every direction. If one could get a bird's-eye view of the ice-fields, they would seem to be cut up into squares or meshes by a network of these packed ridges, or pressure-dykes as we called them, because they reminded us so much of snow-covered stone dykes at home, such as, in many parts of the country, are used to enclose fields. At first sight these pressure-ridges appeared to be scattered about in all possible directions, but on closer inspection I was sure that I discovered certain directions which they tended to take, and especially that they were apt to run at right angles to the course of the pressure which produced them. In the accounts of Arctic expeditions one often reads descriptions of pressure-ridges or pressure-hummocks as high as 50 feet. These are fairy tales. The authors of such fantastic descriptions cannot have taken the trouble to measure. During the whole period of our drifting and of our travels over the ice-fields in

the far north I only once saw a hummock of a greater height than 23 feet. Unfortunately I had not the opportunity of measuring this one, but I believe I may say with certainty that it was very nearly 30 feet high. All the highest blocks I measured—and they were many—had a height of 18 to 23 feet; and I can maintain with certainty that the packing of sea ice to a height of over 25 feet is a very rare exception.*

"Saturday, October 14th. To-day we have got on the rudder; the engine is pretty well in order, and we are clear to start north when the ice opens to-morrow morning. It is still slackening and packing quite regularly twice a day, so that we can calculate on it beforehand. To-day we had the same open channel to the north, and beyond it open sea as far as our view extended. What can this mean? This evening the pressure has been pretty violent. The floes were packed up against the *Fram* on the port side, and were once or twice on the point of toppling over the rail. The ice, however, broke below; they tumbled back again, and had to go under us after all. It is not thick

* Markham's account gives us to understand that on the north side of Grinnell Land he came across hummocks which measured 43 feet. I do not feel at all certain that these were not in reality icebergs; but it is no doubt possible that such hummocks might be formed by violent pressure against land or something resembling it. After our experience, however, I cannot believe in the possibility of their occurring in open sea.

ice, and cannot do much damage; but the force is something enormous. On the masses come incessantly without a pause; they look irresistible; but slowly and surely they are crushed against the *Fram's* sides. Now (8.30 p.m.) the pressure has at last stopped. Clear evening, sparkling stars, and flaming northern lights."

I had finished writing my diary, gone to bed, and was lying reading, in "The Origin of Species," about the struggle for existence, when I heard the dogs out on the ice making more noise than usual. I called into the saloon that some one ought to go up and see if it was bears they were barking at. Hansen went, and came back immediately, saying that he believed he had seen some large animal out in the dark. "Go and shoot it, then." That he was quite ready to do, and went up again at once, accompanied by some of the others. A shot went off on deck above my head, then another; shot followed shot, nine in all. Johansen and Henriksen rushed down for more cartridges, and declared that the creature was shot, it was roaring so horribly; but so far they had only indistinctly seen a large greyish-white mass out there in the dark, moving about among the dogs. Now they were going on to the ice after it. Four of them set off, and not far away they really did find a dead bear, with marks of two shots. It was a young one. The old one must be at hand, and the dogs were still barking loudly. Now they all felt sure that they had seen two together, and that the other also

must be badly wounded. Johansen and Henriksen heard it groaning in the distance when they were out on the ice again afterwards to fetch a knife they had left lying where the dead one had lain. The creature had been dragged on board and skinned at once, before it had time to stiffen in the cold.

"Sunday, October 15th. To our surprise, the ice did not slacken away much during last night, after the violent pressure; and what was worse, there was no indication of slackening in the morning, now that we were quite ready to go. Slight signs of it showed themselves a little later, upon which I gave orders to get up steam; and while this was being done, I took a stroll on the ice, to look for traces of yesterday evening. I found tracks not only of the bear that had been killed and of a larger one that might be the mother, but of a third, which must have been badly wounded, as it had sometimes dragged itself on its hindquarters, and had left a broad track of blood. After following the traces for a good way and discovering that I had no weapon to despatch the animal with but my own fists, I thought it would be as well to return to the ship to get a gun and companions who would help to drag the bear back. I had also some small hope that in the meantime the ice might have slackened, so that, in place of going after game, we might go north with the *Fram*. But no such luck! So I put on my snowshoes and set off after our bear, some of the

dogs with me, and one or two men following. At some distance we came to the place where it had spent the night—poor beast, a ghastly night! Here I also saw tracks of the mother. One shudders to think of her watching over her poor young one, which must have had its back shot through. Soon we came up to the cripple, dragging itself away from us over the ice as best it could. Seeing no other way of escape, it threw itself into a small water opening and dived time after time. While we were putting a noose on a rope, the dogs rushed round the hole as if they had gone mad, and it was difficult to keep them from jumping into the water after the bear. At last we were ready, and the next time the creature came up it got a noose round one paw and a ball in the head. Whilst the others drew it to the ship, I followed the mother's tracks for some way, but could not find her. I had soon to turn back to see if there was no prospect of moving the *Fram;* but I found that the ice had packed together again a little at the very time when we could generally calculate on its slackening. In the afternoon Hansen and I went off once more after the bear. We saw, as I expected, that she had come back, and had followed her daughter's funeral procession for some way, but then she had gone off east, and as it grew dark we lost her tracks in some newly packed ice. We have only one matter for regret in connection with this bear episode, and that is the disappearance of two dogs: 'Narrifas' and

'Fox.' Probably they went off in terror on the first appearance of the three bears. They may have been hurt, but I have seen nothing to suggest this. The ice is quiet this evening also, only a little pressure about 7 o'clock.

"Monday, October 16th. Ice quiet and close. Observations on the 12th placed us in 78° 5′ north latitude. Steadily southwards. This is almost depressing. The two runaways returned this morning.

"Tuesday, October 17th. Continuous movement in the ice. It slackened a little again during the night; some way off to starboard there was a large opening. Shortly after midnight there was strong pressure, and between 11 and 12 a.m. came a tremendous squeeze; since then it has slackened again a little."

"Wednesday, October 18th. When the meteorologist, Johansen, was on deck this morning reading the thermometers, he noticed that the dogs, which are now tied up on board, were barking loudly down at something on the ice. He bent over the rail astern, near the rudder, and saw the back of a bear below him, close in at the ship's side. Off he went for a gun, and the animal fell with a couple of shots. We saw afterwards by its tracks that it had inspected all the heaps of sweepings round the ship.

"A little later in the morning I went for a stroll on the ice. Hansen and Johansen were busy with some magnetic observations to the south of the ship. It was

beautiful sunshiny weather. I was standing beside an open pool a little way ahead, examining the formation and growth of the new ice, when I heard a gun go off on board. I turned, and just caught a glimpse of a bear making off towards the hummocks. It was Henriksen, who had seen it from the deck coming marching towards the ship. When it was a few paces off it saw Hansen and Johansen, and made straight for them. By this time Henriksen had got his gun, but it missed fire several times. He has an unfortunate liking for smearing the lock so well with vaseline that the spring works as if it lay in soft soap. At last it went off, and the ball went through the bear's back and breast in a slanting direction. The animal stood up on its hind-legs, fought the air with its fore-paws, then flung itself forward and sprang off, to fall after about 30 steps ; the ball had grazed the heart. It was not till the shot went off that Hansen saw the bear, and then he rushed up and put two revolver balls into its head. It was a large bear, the largest we had got yet."

"About mid-day I was in the crow's-nest. In spite of the clear weather I could not discover land on any side. The opening far to the north has quite disappeared ; but during the night a large new one has formed quite close to us. It stretches both north and south, and has now a covering of ice. The pressure is chiefly confined to the edges of this opening, and can be traced in walls of packed ice as far as the horizon in both directions. To

the east the ice is quite unbroken and flat. We have lain just in the worst pressure."

"Thursday, October 19th. The ice again slackened a little last night. In the morning I attempted a drive with six of the dogs. When I had managed to harness them to the Samoyede sledge, had seated myself on it, and called 'Pr-r-r-r, pr-r-r-r!' they went off in quite good style over the ice. But it was not long before we came to some high pack-ice and had to turn. This was hardly done before they were off back to the ship at lightning speed, and they were not to be got away from it again. Round and round it they went, from refuse-heap to refuse-heap. If I started at the gangway on the starboard side, and tried by thrashing them to drive them out over the ice, round the stern they flew to the gangway on the port side. I tugged, swore, and tried everything I could think of, but all to no purpose. I got out and tried to hold the sledge back, but was pulled off my feet, and dragged merrily over the ice in my smooth sealskin breeches, on back, stomach, side, just as it happened. When I managed to stop them at some pieces of pack-ice or a dust-heap, round they went again to the starboard gangway, with me dangling behind, swearing madly that I would break every bone in their bodies when I got at them. This game went on till they probably tired of it, and thought they might as well go my way for a change. So now they went off beautifully across the flat floe until I stopped for a moment's breathing space. But

at the first movement I made in the sledge they were off again, tearing wildly back the way we had come. I held on convulsively, pulled, raged, and used the whip; but

Drawn by] MY FIRST ATTEMPT AT DOG DRIVING. [*A. Bloch.*

the more I lashed the faster they went on their own way. At last I got them stopped by sticking my legs down into the snow between the sledge-shafts, and driving a

strong seal-hook into it as well. But while I was off my guard for a moment they gave a tug. I lay with my hinder-part where my legs had been, and we went on at lightning speed—that substantial part of my body leaving a deep track in the snow. This sort of thing went on time after time. I lost the board I should have sat on, then the whip, then my gloves, then my cap—these losses not improving my temper. Once or twice I ran round in front of the dogs, and tried to force them to turn by lashing at them with the whip. They jumped to both sides, and only tore on the faster; the reins got twisted round my ankles, and I was thrown flat on the sledge, and they went on more wildly than ever. This was my first experience in dog-driving on my own account, and I will not pretend that I was proud of it. I inwardly congratulated myself that my feats had been unobserved."

"In the afternoon I examined the melted water of the newly-formed brownish-red ice, of which there is a good deal in the openings round us here. The microscope proved this colour to be produced by swarms of small organisms, chiefly plants—quantities of diatoms and some algæ, a few of them very peculiar in form."

"Saturday, October 21st. I have stayed in to-day because of an affection of the muscles, or rheumatism, which I have had for some days on the right side of my body, and for which the doctor is 'massaging' me, thereby greatly adding to my sufferings. Have I really grown so old and palsied, or is the whole

thing imagination? It is all I can do to limp about; but I just wonder if I could not get up and run with the best of them, if there happened to be any great occasion for it: I almost believe I could. A nice Arctic hero of 32, lying here in my berth! Have had a good time reading home letters, dreaming myself at home, dreaming of the home-coming—in how many years? Successful or unsuccessful, what does that matter?

"I had a sounding taken; it showed over 73 fathoms (135 m.), so we are in deeper water again. The sounding-line indicated that we are drifting south-west. I do not understand this steady drift southwards. There has not been much wind either lately; there is certainly a little from the north to-day, but not strong. What can be the reason of it? With all my information, all my reasoning, all my putting of two and two together, I cannot account for any south-going current here—there ought to be a north-going one. If the current runs south here, how is that great open sea we steamed north across, to be explained? and the bay we ended in farthest north? These could only be produced by the north-going current which I pre-supposed. The only thing which puts me out a bit is that west-going current which we had against us during our whole voyage along the Siberian coast. We are never going to be carried away south by the New Siberian Islands, and then west along the coast of Siberia, and then north by Cape Chelyuskin, the very way we came! That

would be rather too much of a good thing—to say nothing of its being dead against every calculation.

"Well, who cares? Somewhere we must go; we can't stay here for ever. 'It will all come right in the end,' as the saying goes; but I wish we could get on a little faster wherever we are going. On our Greenland Expedition, too, we were carried south to begin with, and that ended well."

"Sunday, October 22nd. Henriksen took soundings this morning, and found 70 fathoms (129 m.) of water. 'If we are drifting at all,' said he, 'it is to the east; but there seems to be almost no movement.' No wind to-day. I am keeping in my den."

"Monday, October 23rd. Still in the den. To-day, 5 fathoms shallower than yesterday. The line points south-west, which means that we are drifting north-eastward. Hansen has reckoned out the observation for the 19th, and finds that we must have got 10 minutes farther north, and must be in 78° 15′ N. lat. So at last, now that the wind has gone down, the north-going current is making itself felt. Some channels have opened near us, one along the side of the ship, and one ahead, near the old channel. Only slight signs of pressure in the afternoon."

"Tuesday, October 24th. Between 4 and 5 a.m. there was strong pressure, and the *Fram* was lifted up a little. It looks as if the pressure were going to begin again; we have spring-tide with full-moon. The ice

opened so much this morning that the *Fram* was afloat in her cutting; later on it closed again, and about 11 there was some strong pressure; then came a quiet time; but in the afternoon the pressure began once more, and was violent from 4 to 4.30. The *Fram* was shaken and lifted up; didn't mind a bit. Peter gave it as his opinion that the pressure was coming from the north-east, for he had heard the noise approaching from that direction. Johansen let down the silk net for me about 11 fathoms. It was all he could do to get it up again in time, but it brought up a good catch. Am still keeping in."

"Wednesday, October 25th. We had a horrible pressure last night. I awoke and felt the *Fram* being lifted, shaken, and tossed about, and heard the loud cracking of the ice breaking against her sides. After listening for a little while I fell asleep again, with a snug feeling that it was good to be on board the *Fram;* it would be confoundedly uncomfortable to have to be ready to turn out every time there was a little pressure, or to have to go off with our bundles on our backs like the 'Tegethoff' people."

"It is quickly getting darker. The sun stands lower and lower every time we see it; soon it will disappear altogether, if it has not done so already. The long dark winter is upon us, and glad shall we be to see the spring; but nothing matters much if we could only begin to move north. There is now south-westerly

wind, and the windmill, which has been ready for several days, has been tried at last and works splendidly. We have beautiful electric light to-day, though the wind has not been specially strong (5–8 m. (16–26 feet) per second). Electric lamps are a grand institution. What a strong influence light has on one's spirits! There was a noticeable brightening-up at the dinner table to-day; the light acted on our spirits like a draught of good wine. And how festive the saloon looks! We felt it quite a great occasion—drank Oscar Dickson's health, and voted him the best of good fellows.

"Wonderful moonshine this evening, light as day; and along with it aurora borealis, yellow and strange in the white moonlight; a large ring round the moon—all this over the great stretch of white, shining ice, here and there in our neighbourhood piled up high by the pressure. And in the midst of this silent silvery ice-world the windmill sweeps round its dark wings against the deep blue sky and the aurora. A strange contrast: civilization making a sudden incursion into this frozen ghostly world.

"To-morrow is the *Fram's* birthday. How many memories it recalls of the launch day a year ago."

"Thursday, October 26th. 164 fathoms (300 m.) of water when the soundings were taken this morning. We are moving quickly north—due north—says Peter. It does look as if things were going better. Great celebration of the day, beginning with target-shooting.

Then we had a splendid dinner of four courses, which put our digestive apparatus to a severe test. The *Fram's* health was drunk amidst great and stormy applause. The proposer's words were echoed by all hearts when he said that she was such an excellent ship for our purpose, that we could not imagine a better (great applause), and we therefore wished her, and ourselves with her, long life (hear, hear). After supper came strawberry and lemon punch, and prizes were presented with much ceremony and a good deal of fun; all being 'taken off' in turn in suitable mottoes, for the most part composed by the ship's doctor. There was a prize for each man. The first prize-taker was awarded the wooden cross of the Order of the *Fram*, to wear suspended from his neck by a ribbon of white tape; the last received a mirror, in which to see his fallen greatness. Smoking in the saloon was allowed this evening, so now pipes, toddy, and an animated game of whist, ended a bright and successful holiday.

"Sitting here now alone, my thoughts involuntarily turn to the year that has gone since we stood up there on the platform, and she threw the champagne against the bow, saying:—'*Fram* is your name!' and the strong, heavy hull began to glide so gently. I held her hand tight; the tears came into eyes and throat, and one could not get out a word. The sturdy hull dived into the glittering water; a sunny haze lay over the whole picture. Never shall I forget the moment we stood there

together, looking out over the scene. And to think of all that has happened these four last months! Separated by sea and land and ice; coming years, too, lying between us—it is all just the continuation of what happened that day. But how long is it to last? I have such difficulty in feeling that I am not to see home again soon. When I begin to reflect, I know that it may be long, but I will not believe it.

"To-day, moreover, we took solemn farewell of the sun. Half of its disc showed at noon for the last time above the edge of the ice in the south, a flattened body, with a dull red glow, but no heat. Now we are entering the night of winter. What is it bringing us? Where shall we be when the sun returns? No one can tell. To console us for the loss of the sun, we have the most wonderful moonlight; the moon goes round the sky night and day. There is, strange to say, little pressure just now; only an occasional slight squeeze. But the ice often opens considerably; there are large pieces of water in several directions; to-day there were some good-sized ones to the south."

"Friday, October 27th. The soundings this morning showed 52 fathoms (95 m.) of water. According to observations taken yesterday afternoon, we are about 3′ farther north, and a little farther west than on the 19th. It is disgusting the way we are muddling about here. We must have got into a hole where the ice grinds round and round, and can't get farther. And the

time is passing all to no purpose; and goodness only knows how long this sort of thing may go on. If only a good south wind would come and drive us north, out of this hobble! The boys have taken up the rudder again to-day. While they were working at this in the afternoon, it suddenly grew as bright as day. A strange fire-ball crossed the sky in the west—giving a bluish-white light, they said. Johansen ran down to the saloon to tell Hansen and me; he said they could still see the bright trails it had left in its train. When we got on deck we saw a bent bow of light in the 'Triangle,' near 'Deheb.' The meteor had disappeared in the neighbourhood of 'Epsilon Cygni' (constellation 'Swan'), but its light remained for a long time floating in the air like glowing dust. No one had seen the actual fire-ball, as they had all had their backs turned to it, and they could not say if it had burst. This is the second great meteor of exceptional splendour that has appeared to us in these regions. The ice has a curious inclination to slacken, without pressure having occurred, and every now and then we find the ship floating in open water. This is the case to-day."

"Saturday, October 28th. Nothing of any importance. Moonshine night and day. A glow in the south from the sun."

"Sunday, October 29th. Peter shot a white fox this morning close in to the ship. For some time lately we have been seeing fox tracks in the mornings, and one

Sunday Mogstad saw the fox itself. It has, no doubt, been coming regularly to feed on the offal of the bears. Shortly after the first one was shot another was seen; it came and smelt its dead comrade, but soon set off again and disappeared. It is remarkable that there should be so many foxes on this drift-ice so far from land. But after all it is not much more surprising than my coming upon fox tracks out on the ice between Jan Mayen and Spitzbergen."

"Monday, October 30th. To-day the temperature has gone down 18° F. below zero (− 27° C.). I took up the dredge I had put out yesterday. It brought up two pails of mud from the bottom, and I have been busy all day washing this out in the saloon in a large bath, to get the many animals contained in it. They were chiefly starfish, waving starfish, medusæ (*astrophyton*), sea-slugs, coral insects (*alcyonaria*), worms, sponges, shell-fish, and crustaceans; and were, of course, all carefully preserved in spirits."

"Tuesday, October 31st. Forty-nine fathoms (90 m.) of water to-day, and the current driving us hard to the south-west. We have good wind for the mill now, and the electric lamps burn all day. The arc lamp under the skylight makes us quite forget the want of sun. Oh! light is a glorious thing, and life is fair in spite of all privations! This is Sverdrup's birthday, and we had revolver practice in the morning. Of course a magnificent dinner of five courses: chicken soup, boiled

mackerel, reindeer ribs with baked cauliflower and potatoes, macaroni pudding, and stewed pears with milk—Ringnes ale to wash it down."

"Thursday, November 2nd. The temperature keeps at about 22° F. below zero (—30° C.) now; but it does not feel very cold, the air is so still. We can see the aurora borealis in the day-time too. I saw a very remarkable display of it about 3 this afternoon. On the south-western horizon lay the glow of the sun; in front of it light clouds were swept together—like a cloud of dust rising above a distant troop of riders. Then dark streamers of gauze seemed to stretch from the dust-cloud up over the sky, as if it came from the sun, or perhaps rather as if the sun were sucking it in to itself from the whole sky. It was only in the south-west that these streamers were dark; a little higher up, farther from the sun glow, they grew white and shining, like fine, glistening silver gauze. They spread over the vault of heaven above us, and right away towards the north. They certainly resembled aurora borealis; but perhaps they might be only light vapours hovering high up in the sky, and catching the sunlight? I stood long looking at them. They were singularly still, but they *were* northern lights, changing gradually in the south-west into dark cloud-streamers, and ending in the dust-cloud over the sun. Hansen saw them too, later, when it was dark. There was no doubt of their nature. His impression was that the aurora borealis spread from the

sun over the whole vault of heaven like the stripes on the inner skin of an orange."

"Sunday, November 5th. A great race on the ice was advertised for to-day. The course was measured, marked off, and decorated with flags. The cook had prepared the prizes—cakes, numbered, and properly graduated in size. The expectation was great; but it turned out that, from excessive training during the few last days, the whole crew were so stiff in the legs that they were not able to move. We got our prizes all the same. One man was blind-folded, and he decided who was to have each cake as it was pointed at. This just arrangement met with general approbation, and we all thought it a pleasanter way of getting the prizes than running half-a-mile for them."

"So it is Sunday once more. How the days drag past! I work, read, think, and dream; strum a little on the organ; go for a walk on the ice in the dark. Low on the horizon in the south-west there is the flush of the sun—a dark fierce red, as if of blood aglow with all life's smouldering longings—low and far-off, like the dream-land of youth. Higher in the sky it melts into orange, and that into green and pale blue; and then comes deep blue, star sown, and then infinite space, where no dawn will ever break. In the north are quivering arches of faint aurora, trembling now like awakening longings, but presently, as if at the touch of a magic wand, to storm as streams of light through the dark blue of heaven—

never at peace, restless as the very soul of man. I can sit and gaze and gaze, my eyes entranced by the dream-glow yonder in the west, where the moon's thin pale, silver-sickle is dipping its point into the blood; and my soul is borne beyond the glow, to the sun, so far off now—and to the home-coming! Our task accomplished, we are making our way up the fjord as fast as sail and steam can carry us. On both sides of us the homeland lies smiling in the sun; and then . . . . the sufferings of a thousand days and hours melt into a moment's inexpressible joy. Ugh! that was a bitter gust—I jump up and walk on. What am I dreaming about! so far yet from the goal—hundreds and hundreds of miles between us, ice and land and ice again. And we are drifting round and round in a ring, bewildered attaining nothing, only waiting, always waiting, for what?

> "I dreamt I lay on a grassy bank,
> And the sun shone warm and clear,
> I wakened on a desert isle,
> And the sky was black and drear."

"One more look at the star of home, the one that stood that evening over Cape Chelyuskin, and I creep on board, where the windmill is turning in the cold wind, and the electric light is streaming out from the skylight upon the icy desolation of the Arctic night."

"Wednesday, November 8th. The storm (which we had had the two previous days) is quite gone down;

not even enough breeze for the mill. We tried letting the dogs sleep on the ice last night, instead of bringing them on board in the evening, as we have been doing lately. The result was that another dog was torn to pieces during the night. It was 'Ulabrand,' the old brown, toothless fellow, that went this time. 'Job' and 'Moses' had gone the same way before. Yesterday evening's observations place us in 77° 43′ N. lat. and 138° 8′ E. long. This is farther south than we have been yet. No help for it; but it is a sorry state of matters; and that we are farther east than ever before is only a poor consolation. It is new moon again, and we may therefore expect pressure; the ice is, in fact, already moving; it began to split on Saturday, and has broken up more each day. The channels have been of a good size, and the movement becomes more and more perceptible. Yesterday there was slight pressure, and we noticed it again this morning about 5 o'clock. To-day the ice by the ship has opened, and we are almost afloat.

"Here I sit in the still winter night on the drifting ice-floe, and see only stars above me. Far off I see the threads of life twisting themselves into the intricate web which stretches unbroken from life's sweet morning dawn to the eternal death-stillness of the ice. Thought follows thought—you pick the whole to pieces, and it seems so small—but high above all towers one form. . . . *Why did you take this voyage?* . . . . Could I do otherwise? Can the river arrest its course and run

up hill? My plan has come to nothing. That palace of theory, which I reared in pride and self-confidence, high above all silly objections, has fallen like a house of cards at the first breath of wind. Build up the most ingenious theories, and you may be sure of one thing—that fact will defy them all. Was I so very sure? Yes, at times; but that was self-deception, intoxication. A secret doubt lurked behind all the reasoning. It seemed as though the longer I defended my theory, the nearer I came to doubting it. But *no*, there is no getting over the evidence of that Siberian drift-wood.

"But if, after all, we are on the wrong track, what then? Only disappointed human hopes, nothing more. And even if we perish, what will it matter in the endless cycles of eternity?"

"Thursday, November 9th. I took temperatures and sea-water samples to-day every 10 yards from the surface to the bottom. The depth was $9\frac{1}{2}$ fathoms. An extraordinarily even temperature of 30° Fahr. (−1·5 C.) through all the layers. I have noticed the same thing before as far south as this. So it is only polar water here? There is not much pressure; an inclination to it this morning, and a little at 8 o'clock this evening, also a few squeezes later, when we were playing cards."

"Friday, November 10th. This morning made despairing examinations of yesterday's water samples with Thornöe's electric apparatus. There must be absolute stillness on board when this is going on. The

men are all terrified, slip about on tiptoe, and talk in the lowest possible whispers. But presently one begins to hammer at something on deck, and another to file in the engine-room, when the chief's commanding voice is at once heard, ordering silence. These examinations are made by means of a telephone, through which a very faint noise is heard, which dies slowly away; the moment at which it stops must be exactly ascertained.

"I find remarkably little salt all the way to the bottom in the water here; it must be mixed with fresh water from the Siberian river.

"There was some pressure this morning, going on till nearly noon, and we heard the noise of it in several directions. In the afternoon the ice was quite slack, with a large opening alongside the port side of the ship. At half-past seven pretty strong pressure began, the ice crashing and grinding along the ship's side. About midnight the roar of packing was heard to the south.

"Saturday, November 11th. There has been some pressure in the course of the day. The newly-formed ice is about 15 inches thick. It is hard on the top, but looser and porous below. This particular piece of ice began to form upon a large opening in the night between the 27th and 28th October, so it has frozen 15 inches in 15 days. I observed that it froze 3 inches the first night, and 5 inches altogether during the three first nights; so that it has taken 12 days to the last 10 inches."

Even this small observation serves to show that the formation of ice goes on most easily where the crust is thin, becoming more and more difficult as the thickness increases, until at a certain thickness, as we observed later, it stops altogether. "It is curious that the pressure has gone on almost all day—no slackening such as we have usually observed."

"Sunday, November 19th.—Our life has gone on its usual monotonous routine since the 11th. The wind has been steadily from the south all the week, but to-day there is a little from N.N.W. We have had pressure several times, and have heard sounds of it in the south-east. Except for this, the ice has been unusually quiet, and it is closed in tightly round the ship. Since the last strong pressure we have probably 10 to 20 feet of ice packed in below us.* Hansen to-day worked out an observation taken the day before yesterday, and surprised us with the welcome intelligence that we have travelled 44′ north and a little east since the 8th. We are now in 78° 27′ north latitude, 139° 23′ east longitude. This is farther east than we have been yet. For any sake let us only keep on as we are going!

"The *Fram* is a warm, cosy abode. Whether the thermometer stands at 22° above zero or at 22° below it, we have no fire in the stove. The ventilation is

* On a later occasion, they bored down 30 feet without reaching the lower surface of the ice.

excellent, especially since we rigged up the air sail, which sends a whole winter's cold in through the ventilator; yet in spite of this we sit here warm and comfortable, with only a lamp burning. I am thinking of having the stove removed altogether; it is only in the way. At least, as far as our protection from the winter cold is concerned, my calculations have turned out well. Neither do we suffer much from damp. It does collect and drop a little from the roof in one or two places, especially astern in the four-man cabins; but nothing in comparison with what is common in other ships; and if we lighted the stove it would disappear altogether. When I have burned a lamp for quite a short time in my cabin, every trace of damp is gone.* These are extraordinary fellows for standing the cold. With the thermometer at 22° F. below zero Bentzen goes up in his shirt and trousers to read the thermometer on deck."

"Monday, November 27th. The prevailing wind has been southerly, with sometimes a little east. The temperature still keeps between 13° and 22° below zero; in the hold it has fallen to 12°."

It has several times struck me that the streamers of the aurora borealis followed in the direction of the wind, from the wind's eye on the horizon. On Thursday

* When we had fire in the stoves later, especially during the following winter, there was not a sign of damp anywhere—neither in saloon nor small cabins. It was, if anything, rather too dry, for the panels of the walls and roof dried and shrank considerably.

morning, when we had very slight north-easterly wind, I even ventured to prophesy, from the direction of the streamers, that it would go round to the south-east, which it accordingly did. On the whole there has been much less of the aurora borealis lately than at the beginning of our drift. Still, though it may have been faint, there has been a little every day. To-night it is very strong again. These last days the moon has sometimes had rings round it, with mock-moons and axes—accompanied by rather strange phenomena. When the moon stands so low that the ring touches the horizon, a bright field of light is formed where the horizon cuts the ring. Similar expanses of light are also formed where the perpendicular axis from the moon intersects the horizon. Faint rainbows are often to be seen in these shining light-fields; yellow was generally the strongest tint nearest the horizon, passing over into red, and then into blue. Similar colours could also be distinguished in the mock-moons. Sometimes there are two large rings—the one outside the other—and then there may be four mock-moons. I have also seen part of a new ring above the usual one, meeting it at a tangent directly above the moon. As is well known, these various ring formations round the sun, as well as round the moon, are produced by the refraction of rays of light by minute ice crystals floating in the air.

"We looked for pressure with full moon and spring tide on 23rd of November; but then, and for several days

afterwards, the ice was quite quiet. On the afternoon of Saturday, the 25th, however, its distant roar was heard from the south, and we have heard it from the same direction every day since. This morning it was very loud, and came gradually nearer. At nine o'clock it was quite close to us, and this evening we hear it near us again. It seems, however, as if we had now got out of the groove to which the pressure principally confines itself. We were regularly in it before. The ice round us is perfectly quiet. The probability is that the last severe pressure packed it very tight about us, and that the cold since has frozen it into such a thick strong mass that it offers great resistance, while the weaker ice in other places yields to the pressure. The depth of the sea is increasing steadily, and we are drifting north. This evening Hansen has worked out the observations of the day before yesterday, and finds that we are in 79° 11′ north latitude. That is good, and the way we ought to get on. It is the most northern point we have reached yet, and to day we are in all likelihood still farther north. We have made good way these last days, and the increasing depth seems to indicate a happy change in the direction of our drift. Have we, perhaps, really found the right road at last? We are drifting about 5′ a day. The most satisfactory thing is that there has not been much wind lately, especially the two last days; yesterday it was only about 3 feet per second; to-day is perfectly still, and yet the depth has increased

21 fathoms (40 m.) in these two days. It seems as if there were a northerly current after all. No doubt many disappointments await us yet; but why not rejoice while fortune smiles?"

"Tuesday, November 28th. The disappointment lost no time in coming. There had been a mistake either in the observation or in Hansen's calculations. An altitude of Jupiter taken yesterday evening shows us to be in 78° 36′ north latitude. The soundings to-day showed 74 fathoms (142 m.) of water, or about the same as yesterday, and the sounding-line indicated a south-westerly drift. However anxious one is to take things philosophically, one can't help feeling a little depressed. I try to find solace in a book; absorb myself in the learning of the Indians—their happy faith in transcendental powers, in the supernatural faculties of the soul, and in a future life. Oh, if one could only get hold of a little supernatural power now, and oblige the winds always to blow from the south!

"I went on deck this evening in rather a gloomy frame of mind, but was nailed to the spot the moment I got outside. There is the supernatural for you—the northern lights flashing in matchless power and beauty over the sky in all the colours of the rainbow! Seldom or never have I seen the colours so brilliant. The prevailing one at first was yellow, but that gradually flickered over into green, and then a sparkling ruby-red began to show at the bottom of the rays on the under

side of the arch, soon spreading over the whole arch. And now from the far-away western horizon a fiery serpent writhed itself up over the sky, shining brighter and brighter as it came. It split into three, all brilliantly glittering. Then the colours changed. The serpent to the south turned almost ruby-red, with spots of yellow; the one in the middle, yellow; and the one to the north, greenish-white. Sheafs of rays swept along the sides of the serpents, driven through the ether-like waves before a storm-wind. They sway backwards and forwards, now strong, now fainter again. The serpents reached and passed the zenith. Though I was thinly dressed and shivering with cold, I could not tear myself away till the spectacle was over, and only a faintly-glowing fiery serpent near the western horizon showed where it had begun. When I came on deck later the masses of light had passed northwards, and spread themselves in incomplete arches over the northern sky. If one wants to read mystic meanings into the phenomena of nature, here, surely, is the opportunity.

"The observation this afternoon showed us to be in 78° 38′ 42″ N. lat. This is anything but rapid progress.

"Wednesday, November 29th. Another dog has been bitten to death to-day—'Fox,' a handsome, powerful animal. He was found lying dead and stiff on the ice at our stern this evening when they went to bring the dogs in, 'Suggen' performing her usual duty of watching the body. They are wretches, these dogs. But now I

have given orders that some one must always watch them when they are out on the ice."

"Thursday, November 30th. The lead showed a depth of exactly 93 fathoms (170 m.) to-day, and it seemed by the line as if we were drifting north-west. We are almost certainly further north now; hopes are rising, and life is looking brighter again. My spirits are like a pendulum, if one could imagine such an instrument giving all sorts of irregular swings backwards and forwards. It is no good trying to take the thing philosophically; I cannot deny that the question whether we are to return successful or unsuccessful affects me very deeply. It is quite easy to convince myself with the most incontrovertible reasoning that what really matters is to carry through the expedition, whether successfully or not, and get safe home again. I could not but undertake it; for my plan was one that I felt must succeed, and therefore it was my duty to try it. Well, if it does not succeed, is that my affair? I have done my duty, done all that could be done, and can return home with an easy conscience to the quiet happiness I have left behind. What can it matter whether chance, or whatever name you like to give it, does or does not allow the plan to succeed and make our names immortal? The worth of the plan is the same whether chance smiles or frowns upon it. And as to immortality, happiness is all we want, and that is not to be had here.

"I can say all this to myself a thousand times; I can bring myself to believe honestly that it is all a matter of indifference to me; but none the less my spirits change like the clouds of heaven according as the wind blows from this direction or from that, or the soundings show the depth to be increasing or not, or the observations indicate a northerly or southerly drift. When I think of the many that trust us, think of Norway, think of all the friends that gave us their time, their faith, and their money, the wish comes that they may not be disappointed, and I grow sombre when our progress is not what we expected it would be. And she that gave most—does she deserve that her sacrifice should have been made in vain? Ah, yes, we must and will succeed!"

"Sunday, December 3rd. Sunday again, with its feeling of peace, and its permission to indulge in the narcotic of happy day-dreams, and let the hours go idly by, without any prickings of conscience.

"To-day the bottom was not reached with over $135\frac{1}{2}$ fathoms (250 m.) of line. There was a north-easterly drift. Yesterday's observation showed us to be in 78° 44′ north latitude, that is 5′ farther north than on Tuesday. It is horribly slow; but it is forward, and forward we must go; there can be no question of that."

"Tuesday, December 5th.—This is the coldest day we have had yet, with the thermometer 31° below zero (− 35·7° C.) and a biting wind from the E.S.E.

Johansen. Scott-Hansen.

A CHRONOMETER-OBSERVATION WITH THE THEODOLITE.

(From a photograph.)

Observation in the afternoon shows 78° 50′ north latitude, that is 6′ farther north than on Saturday, or 2′ per day. In the afternoon we had magnificent aurora borealis—glittering arches across the whole vault of the sky from the east towards the west; but when I was on deck this evening the sky was overcast; only one star shone through the cloudy veil—the home star. How I love it! It is the first thing my eye seeks, and it is always there, shining on our path. I feel as if no ill could befall us as long as I see it there . . . .

"Wednesday, December 6th. This afternoon the ice cracked abaft the starboard quarter; this evening I see that the crack has opened. We may expect pressure now, as it is new moon-either to-day or to-morrow."

"Thursday, December 7th. The ice pressed at the stern at five o'clock this morning for about an hour. I lay in my berth and listened to it creaking and grinding and roaring. There was slight pressure again in the afternoon; nothing to speak of. No slackening in the forenoon."

"Friday, December 8th. Pressure from seven till eight this morning. As I was sitting drawing in the afternoon I was startled by a sudden report or crash. It seemed to be straight overhead, as if great masses of ice had fallen from the rigging on to the deck above my cabin. Every one starts up and throws on some extra garment; those that are taking an afternoon nap jump out of their berths right into the middle of the saloon,

calling out to know what has happened. Pettersen rushes up the companion ladder in such wild haste that he bursts open the door in the face of the mate, who is standing in the passage holding back 'Kvik,' who has also started in fright from the bed in the chart-room, where she is expecting her confinement. On deck we could discover nothing, except that the ice was in motion, and seemed to be sinking slowly away from the ship. Great piles had been packed up under the stern this morning and yesterday. The explosion was probably caused by a violent pressure suddenly loosening all the ice along the ship's side, the ship at the same time taking a strong list to port. There was no cracking of wood to be heard, so that, whatever it was, the *Fram* cannot have been injured. But it was cold, and we crept down again.

"As we were sitting at supper, about six o'clock, pressure suddenly began. The ice creaked and roared so along the ship's sides close by us that it was not possible to carry on any connected conversation ; we had to scream, and all agreed with Nordahl when he remarked that it would be much pleasanter if the pressure would confine its operations to the bow instead of coming bothering us here aft. Amidst the noise we caught every now and again from the organ a note or two of Kjerulf's melody: 'I could not sleep for the nightingale's voice.' The hurly-burly outside lasted for about twenty minutes, and then all was still.

"Later in the evening Hansen came down to give notice of what really was a remarkable appearance of aurora borealis. The deck was brightly illuminated by it, and reflections of its light played all over the ice. The whole sky was ablaze with it, but it was brightest in the south; high up in that direction glowed waving masses of fire. Later still Hansen came again to say that now it was quite extraordinary. No words can depict the glory that met our eyes. The glowing fire-masses had divided into glistening, many-coloured bands, which were writhing and twisting across the sky both in the south and north. The rays sparkled with the purest, most crystalline rainbow colours, chiefly violet-red or carmine and the clearest green. Most frequently the rays of the arch were red at the ends, and changed higher up into sparkling green, which quite at the top turned darker, and went over into blue or violet before disappearing in the blue of the sky; or the rays in one and the same arch might change from clear red to clear green, coming and going as if driven by a storm. It was an endless phantasmagoria of sparkling colour, surpassing anything that one can dream. Sometimes the spectacle reached such a climax that one's breath was taken away; one felt that now something extraordinary must happen —at the very least the sky must fall. But as one stands in breathless expectation, down the whole thing trips, as if in a few quick, light scale-runs, into bare nothingness. There is something most undramatic about such a

dénouement, but it is all done with such confident assurance that one cannot take it amiss; one feels one's self in the presence of a master who has the complete command of his instrument. With a single stroke of the bow he descends lightly and elegantly from the height of passion into quiet, every-day strains, only with a few more strokes to work himself up into passion again. It seems as if he were trying to mock, to tease us. When we are on the point of going below, driven by 61 degrees of frost (−34·7 C.), such magnificent tones again vibrate over the strings that we stay, until noses and ears are frozen. For a finale, there is a wild display of fireworks in every tint of flame—such a conflagration that one expects every minute to have it down on the ice, because there is not room for it in the sky. But I can hold out no longer. Thinly dressed, without a proper cap, and without gloves, I have no feeling left in body or limbs, and I crawl away below."

"Sunday, December 10th. Another peaceful Sunday. The motto for the day in the English almanac is:—'He is happy whose circumstances suit his temper: but he is more excellent who can suit his temper to any circumstances' (Hume). Very true, and exactly the philosophy I am practising at this moment. I am lying on my berth in the light of the electric lamp, eating cake and drinking beer whilst I am writing my journal; presently I shall take a book and settle down to read and sleep. The arc lamp has shone like a sun to-day

over a happy company. We have no difficulty now in distinguishing hearts from diamonds on our dirty cards. It is wonderful what an effect light has. I believe I am becoming a fire-worshipper. It is strange enough that fire-worship should not exist in the Arctic countries.

> 'For the sons of men
> Fire is the best,
> And the sight of the sun.'

"A newspaper appears on board now. *Framsjaa** (news of, or outlook from, the *Fram*) is its name, and our doctor is its irresponsible editor. The first number was read aloud this evening, and gave occasion for much merriment. Amongst its contents are :—

'WINTER IN THE ICE.

(Contribution to the Infant *Framsjaa*.)

FAR in the ice there lies a ship, boys,
Mast and sail, ice to the very tip, boys ;
But, perfectly clear,
If you listen you can hear,
There is life and fun on board that ship, boys.
What can it be ?
Come along and see—
It is Nansen and his men that laugh, boys.

* Apparently modelled on the title of the well-known magazine, *Kringsjaa*, which means "A Look Around" or "Survey." *Framsjaa* might be translated "The *Fram's* Look-Out."

Nothing to be heard at night but glasses' clink, boys,
Fall of greasy cards and counters' chink, boys;
If he won't "declare,"
Nordahl he will swear
Bentzen is stupid as an owl, boys.
Bentzen cool, boys,
Is not a fool, boys;
"You're another!" quickly he replies, boys.

From a] A LIVELY GAME OF CARDS. [*Photograph.*

Among those sitting at the table, boys,
Is "Heika,"* with his body big and stable, boys;
He and Lars, so keen,
It would almost seem

* The name Peter Henriksen generally went by on board.

They would stake their lives if they were able, boys.
Amundsen, again,
Looks at these two men,
Shakes his head and sadly goes to bed, boys.*

Sverdrup, Blessing, Hansen, and our Mohn,† boys,
Say of "marriage" "this game is our own," boys;
Soon for them, alas!
The happy hour is past;
And Hansen he says, "Come away, old Mohn!" boys.
"It is getting late,
And the stars won't wait,
You and I must up and out alone," boys.

The doctor here on board has nought to do, boys;
Not a man to test his skill among the crew, boys;
Well may he look blue,
There's nought for him to do,
When every man is strong and hearty, too, boys.
"Now on the *Fram*," boys,
He says "I am," boys,
"Chief editor of newspaper for you!" boys.

"Warning! ! !

"I think it is my duty to warn the public that a travelling watchmaker has been making the round of this neighbourhood lately, getting watches to repair, and not

* Refers to the fact that Amundsen hated card-playing more than anything else in the world. He called cards "the devil's playbooks."

† Nickname of our meteorologist, Johansen, Professor Mohn being a distinguished Norwegian meteorologist.

returning them to their owners. How long is this to be allowed to go on under the eyes of the authorities?

"The watchmaker's appearance is as follows:—Middle height, fair, grey eyes, brown full beard, round shoulders, and generally delicate-looking.

"A. Juell.*

"The person above notified was in our office yesterday, asking for work, and we consider it right to add the following particulars as completing the description. He generally goes about with a pack of mongrel curs at his heels; he chews tobacco, and of this his beard shows traces. This is all we have to say, as we did not consider ourselves either entitled or called upon to put him under the microscope.

"Ed. *Framsjaa.*"

"Yesterday's observation placed us in 79° 0′ north latitude, 139° 14′ east longitude. At last, then, we have got as far north again as we were in the end of September, and now the northerly drift seems to be steady: 10′ in 4 days.

"Monday, December 11th. This morning I took a long excursion to westward. It is hard work struggling

* This signature proved to be forged, and gave rise to a lawsuit so long and intricate that space does not permit an account of it to be given.

over the packed ice in the dark, something like scrambling about a moraine of big boulders at night. Once I took a step in the air, fell forward, and bruised my right knee. It is mild to-day, only $9\frac{1}{2}^{\circ}$ F. below zero (-23° C.). This evening there was a strange appearance of aurora borealis—white, shining clouds, which I thought at first must be lit up by the moon, but there is no moon yet. They were light cumuli, or cirro-cumuli, shifting into a brightly shining mackerel sky. I stood and watched them as long as my thin clothing permitted, but there was no perceptible pulsation, no play of flame; they sailed quietly on. The light seemed to be strongest in the south-east, where there were also dark clouds to be seen. Hansen said that it moved over later into the northern sky; clouds came and went, and for a time there were many white shining ones—'white as lambs,' he called them—but no aurora played behind them."

"In this day's meteorological journal I find noted for 4 p.m.: 'Faint aurora borealis in the north. Some distinct branchings or antlers (they are of ribbon crimped like blonde) in some diffused patches on the horizon in the N.N.E.' In his aurora borealis journal Hansen describes that of this evening as follows: 'About 8 p.m. an aurora borealis arch of light was observed, stretching from E.S.E. to N.W., through the zenith; diffused quiet intensity 3–4, most intense in N.W. The arch spread at the zenith by a wave to the south. At 10 o'clock there was a fainter aurora borealis in the southern sky;

eight minutes later it extended to the zenith, and two minutes after this there was a shining broad arch across the zenith with intensity 6. Twelve seconds later flaming rays shot from the zenith in an easterly direction. During the next half-hour there was constant aurora, chiefly in bands across or near the zenith, or lower in the southern sky. The observation ended about 10.38. The intensity was then 2, the aurora diffused over the southern sky. There were cumulus clouds of varying closeness all the time. They came up in the south-east at the beginning of the observation, and disappeared towards the end of it ; they were closest about 10 minutes past 10. At the time that the broad shining arch through the zenith was at its highest intensity, the cumulus clouds in the north-west shone quite white, though we were unable to detect any aurora borealis phenomena in this quarter. The reflection of light on the ice field was pretty strong at the same time. In the aurora borealis the cumulus clouds appeared of a darker colour, almost the grey of wool. The colours of the aurora were yellowish, bluish-white, milky blue—cold colouring.' According to the meteorological journal there was still aurora borealis in the southern sky at midnight."

"Tuesday, December 12th. Had a long walk south-east this morning. The ice is in much the same condition there as it is to the west, packed or pressed up into mounds, with flat floes between. This evening the

dogs suddenly began to make a great commotion on deck. We were all deep in cards, some playing whist, others 'marriage.' I had no shoes on, so said that some one else must go up and see what was the matter. Mogstad went. The noise grew worse and worse. Presently Mogstad came down and said that all the dogs that could get at the rail were up on it, barking out into the dark towards the north. He was sure there must be an animal of some sort there, but perhaps it was only a fox, for he thought he had heard the bark of a fox far in the north ; but he was not sure. Well, it must be a devil of a fox to excite the dogs like that. As the disturbance continued, I at last went up myself, followed by Johansen. From different positions we looked long and hard into the darkness in the direction in which the dogs were barking, but we could see nothing moving. That something must be there was quite certain ; and I had no doubt that it was a bear, for the dogs were almost beside themselves. 'Pan' looked up into my face with an odd expression, as if he had something important to tell me, and then jumped up on the rail and barked away to the north. The dogs' excitement was quite remarkable ; they had not been so keen when the bear was close in to the side of the ship. However, I contented myself with remarking that the thing to do would be to loose some dogs and go north with them over the ice. But these wretched dogs won't tackle a bear, and besides it is so

dark that there is hardly a chance of finding anything. If it is a bear he will come again. At this season, when he is so hungry, he will hardly go right away from all the good food for him here on board. I struck about with my arms to get a little heat into me, then went below and to bed. The dogs went on barking, sometimes louder than before. Nordahl, whose watch it was, went up several times, but could discover no reason for it. As I was lying reading in my berth I heard a peculiar sound; it was like boxes being dragged about on deck, and there was also scraping, like a dog that wanted to get out, scratching violently at a door. I thought of 'Kvik,' who was shut up in the chart-room. I called into the saloon to Nordahl that he had better go up again and see what this new noise was. He did so, but came back saying that there was still nothing to be seen. It was difficult to sleep, and I lay long tossing about. Peter came on watch. I told him to go up and turn the air-sail to the wind, to make the ventilation better. He was a good time on deck doing this and other things, but he also could see no reason for the to-do the dogs were still making. He had to go forward, and then noticed that the three dogs nearest the starboard gangway were missing. He came down and told me, and we agreed that possibly this might be what all the excitement was about; but never before had they taken it so to heart when some of their number had run away. At last I fell asleep, but heard them in my sleep for a long time."

"Wednesday, December 13th. Before I was rightly awake this morning I heard the dogs 'at it' still, and the noise went on all the time of breakfast, and had, I believe, gone on all night. After breakfast Mogstad and Peter went up to feed the wretched creatures and let them loose on the ice. Three were still missing. Peter came down to get a lantern; he thought he might as well look if there were any tracks of animals. Jacobsen called after him that he had better take a gun. No, he did not need one, he said. A little later, as I was sitting sorrowfully absorbed in the calculation of how much petroleum we have used, and how short a time our supply will last if we go on burning it at the same rate, I heard a scream at the top of the companion. 'Come with a gun.' In a moment I was in the saloon, and there was Peter tumbling in at the door, breathlessly shouting, 'A gun! a gun!' The bear had bitten him in the side. I was thankful that it was no worse, hearing him put on so much dialect* I had thought it was a matter of life and death. I seized one gun, he another, and up we rushed, the mate with his gun after us. There was not much difficulty in knowing in what direction to turn, for from the rail on the starboard side came confused shouts of human voices, and from the ice below the gangway the sound of a frightful uproar of dogs. I tore out the

* He says "ei borsja" for "a gun" instead of "en bosse."

tow-plug at the muzzle of my rifle, then up with the lever and in with the cartridge; it was a case of hurry. But, hang it! there is a plug in at this end too. I poked and poked, but could not get a grip of it. Peter screamed: 'Shoot, shoot! mine won't go off!' He stood clicking and clicking, his lock full of frozen vaseline again, while the bear lay chewing at a dog just below us at the ship's side. Beside me stood the mate, groping after a tow-plug which he also had shoved down into his gun, but now he flung the gun angrily away and began to look round the deck for a walrus spear to stick the bear with. Our fourth man, Mogstad, was waving an empty rifle (he had shot away his cartridges), and shouting to some one to shoot the bear. Four men, and not one that could shoot, although we could have prodded the bear's back with our gun-barrels. Hansen, making a fifth, was lying in the passage to the chart-room, groping with his arm through a chink in the door for cartridges; he could not get the door to open because of 'Kvik's' kennel. At last Johansen appeared and sent a ball straight down into the bear's hide. That did some good. The monster let go the dog and gave a growl. Another shot flashed and hissed down on the same spot. One more, and we saw the white dog the bear had under him jump up and run off, while the other dogs stood round, barking. Another shot still, for the animal began to stir a little. At this moment my plug came out, and I gave him a last ball

through the head to make sure. The dogs had crowded round barking as long as he moved, but now that he lay still in death they drew back terrified. They probably thought it was some new ruse of the enemy. It was a little thin, one-year-old bear that had caused all this terrible commotion.

"Whilst it was being flayed I went off in a north-westerly direction to look for the dogs that were still missing. I had not gone far when I noticed that the dogs that were following me had caught scent of something to the north, and wanted to go that way. Soon they got frightened, and I could not get them to go on; they kept close in to my side or slunk behind me. I held my gun ready, while I crawled on all fours over the pack-ice, which was anything but level. I kept a steady look-out ahead, but it was not far my eyes could pierce in that darkness. I could only just see the dogs, like black shadows, when they were a few steps away from me. I expected every moment to see a huge form rise among the hummocks ahead, or come rushing towards me. The dogs got more and more cautious, one or two of them sat down, but they probably felt that it would be a shame to let me go on alone, so followed slowly after. Terrible ice to force one's way over! Crawling along on hands and knees does not put one in a very convenient position to shoot from if the bear should make a sudden rush. But unless he did this, or attacked the dogs, I had no hope of getting him. We now came out on

some flat ice. It was only too evident that there must be something quite near now. I went on, and presently saw a dark object on the ice in front of me. It was not unlike an animal. I bent down—it was poor 'Johansen's Friend,' the black dog with the white tip to his tail, in a sad state, and frozen stiff. Beside him was something else dark. I bent down again and found the second of the missing dogs, brother of the corpse-watcher 'Suggen.' This one was almost whole, only eaten a little about the head, and it was not frozen quite stiff. There seemed to be blood all round on the ice. I looked about in every direction, but there was nothing more to be seen. The dogs stood at a respectful distance, staring and sniffing in the direction of their dead comrades. Some of us went not long after this to fetch the dogs' carcases, taking a lantern to look for bear tracks, in case there had been some big fellows along with the little one. We scrambled on among the pack-ice. 'Come this way with the lantern, Bentzen; I think I see tracks here.' Bentzen came, and we turned the light on some indentations in the snow; they were bear-paw marks sure enough, but only the same little fellow's. 'Look! the brute has been dragging a dog after him here.' By the light of the lantern we traced the blood-marked path on among the hummocks. We found the dead dogs, but no footprints except small ones, which we all thought must be those of our little bear. 'Svarten,' alias 'Johansen's Friend,' looked bad in the

lantern-light. Flesh and skin and entrails were gone; there was nothing to be seen but a bare breast and backbone, with some stumps of ribs. It was a pity that the fine strong dog should come to such an end. He had just one fault: he was rather bad-tempered. He had a special dislike to Johansen; barked and showed his teeth whenever he came on deck, or even opened a door, and when he sat whistling in the top, or in the crow's-nest these dark winter days, the 'Friend' would answer with a howl of rage from far out on the ice. Johansen bent down with the lantern to look at the remains.

"'Are you glad, Johansen, that your enemy is done for?'

"'No, I am sorry.'

"'Why?'

"'Because we did not make it up before he died.' And we went on to look for more bear-tracks, but found none; so we took the dead dogs on our backs and turned homewards.

"On the way I asked Peter what had really happened with him and the bear. 'Well, you see,' said he, 'when I came along with the lantern we saw a few drops of blood by the gangway; but that might quite well have been a dog that had cut itself. On the ice below the gangway we saw some bear-tracks, and we started away west, the whole pack of dogs with us, running on far ahead. When we had got away a bit from the ship, there was suddenly an awful row in front, and it wasn't

long before a great beast came rushing at us, with the whole troop of dogs around it. As soon as we saw what it was, we turned and ran our best for the ship. Mogstad, you see, he had moccasins (komager) on, and knew his way better and got there before me. I couldn't get along so fast with my great wooden shoes, and in my confusion I got right on to the big hummock to the west of the ship's bow, you know. I turned here and lighted back to see if the bear was behind me, but I saw nothing and pushed on again, and in a minute these slippery wooden shoes had me flat on my back among the hummocks. I was up again quick enough; but when I got down on to the flat ice close to the ship, I saw something coming straight for me on the right-hand side. First I thought it was a dog—it's not so easy to see in the dark, you know—I had no time for a second thought, for the beast jumped on me and bit me in the side. I had lifted my arm like this, you see, and so he caught me here, right on the hip. He growled and hissed as he bit.

"'What did you think then, Peter?'

"'What did I think? I thought it was all up with me. What was I to do? I had neither gun nor knife. But I took the lantern and gave him such a whack on the head with it that the thing broke, and went flying away over the ice. The moment he felt the blow he sat down and looked at me. I was just taking to my heels when he got up; I don't know whether it was to grip me

again or what it was for, but anyhow at that minute he caught sight of a dog coming, and set off after it, and I got on board.'

"'Did you scream, Peter?'

"I TOOK THE LANTERN AND GAVE HIM A WHACK ON THE HEAD WITH IT."
(Drawn by H. Egidius.)

"'Scream! I screamed with all my might.' And apparently this was true, for he was quite hoarse.

"'But where was Mogstad all this time?'

"'Well, you see, he had reached the ship long before me, but he never thought of running down and giving

the alarm, but takes his gun from the round-house wall and thinks he'll manage all right alone, but his gun wouldn't go off, and the bear would have had time to eat me up before his nose.'

"We were now near the ship, and Mogstad, who had heard the last part of the story from the deck, corrected it in so far that he had just reached the gangway when Peter began to roar. He jumped up and fell back three times before he got on board, and had no time to do anything then but seize his gun and go to Peter's assistance.

"When the bear left Peter and rushed after the dogs, he soon had the whole pack about him again. Now he would make a spring and get one below him; but then all the rest would set upon him and jump on his back, so that he had to turn to defend himself. Then he would spring upon another dog, and the whole pack would be on him again. And so the dance went on, backwards and forwards over the ice, until they were once more close to the ship. A dog stood there, below the gangway, wanting to get on board; the bear made a spring on it, and it was there, by the ship's side, that the villain met his fate.

"An examination on board showed that the hook of 'Svarten's' leash was pulled out quite straight; 'Gammelen's' was broken through; but the third dog's was only wrenched a little: it hardly looked as if the bear had done it. I had a slight hope that this dog

might still be in life, but, though we searched well, we could not find it.

"It was altogether a deplorable story. To think that we should have let a bear scramble on board like this, and should have lost three dogs at once! Our dogs are dwindling down; we have only 26 now. That was a wily demon of a bear, to be such a little one. He had crawled on board by the gangway, shoved away a box that was standing in front of it, taken the dog that stood nearest, and gone off with it. When he had satisfied the first pangs of his hunger, he had come back and fetched No. 2, and, if he had been allowed, he would have continued the performance until the deck was cleared of dogs. Then he would probably have come bumping downstairs 'and beckoned with cold hand' in at the galley door to Juell. It must have been a pleasant feeling for 'Svarten' to stand there in the dark and see the bear come creeping in upon him.

"When I went below after this bear affair, Juell said as I passed the galley door: 'You'll see that "Kvik" will have her pups to-day; for it's always the way here on board, that things happen together.' And, sure enough, when we were sitting in the saloon in the evening, Mogstad, who generally plays 'master of the hounds,' came and announced the arrival of the first. Soon there was another, and then one more. This news was a little balsam to our wounds. 'Kvik' has got a good warm box, lined with fur, up in the passage on the

starboard; it is so warm there that she is lying sweating, and we hope that the young ones will live, in spite of 54 degrees of frost. It seems this evening as if every one had some hesitation in going out on the ice unarmed. Our bayonet-knives have been brought out, and I am providing myself with one. I must say that I felt quite certain that we should find no bears as far north as this in the middle of winter; and it never occurred to me, in making long excursions on the ice without so much as a penknife in my pocket, that I was liable to encounters with them. But, after Peter's experience, it seems as if it might be as well to have, at any rate, a lantern to hit them with. The long bayonet-knife shall accompany me henceforth.

"They often chaffed Peter afterwards about having screamed so horribly when the bear seized him. 'H'm! I wonder, said he, 'if there aren't others that would have screeched just as loud. I had to yell after the fellows that were so afraid of frightening the bear that when they ran they covered seven yards at each stride.'

"Thursday, December 14th. 'Well, Mogstad, how many pups have you now?' I asked at breakfast. 'There are five now.' But soon after he came down to tell me that there were at least twelve. Gracious! that is good value for what we have lost. But we were almost as pleased when Johansen came down and said that he heard the missing dog howling on the ice far away to the north-west. Several of us went up to listen.

and we could all hear him quite well; but it sounded as if he were sitting still, howling in despair. Perhaps he was at an opening in the ice that he could not get across. Blessing had also heard him during his night-watch, but then the sound had come more from a south-westerly direction. When Peter went after breakfast to feed the dogs, there was the lost one, standing below the gangway wanting to get on board. Hungry he was, —he dashed straight into the food-dish,—but otherwise hale and hearty.

"This evening Peter came and said that he was certain he heard a bear moving about and pawing the ice; he and Pettersen had stood and listened to him scraping at the snow crust. I put on my 'pesk' (a fur blouse), got hold of my double-barrelled rifle, and went on deck. The whole crew were collected aft, gazing out into the night. We let loose 'Ulenka' and 'Pan,' and went in the direction where the bear was said to be. It was pitch-dark, but the dogs would find the tracks, if there was anything there. Hansen thought he had seen something moving about the hummock near the ship, but we found and heard nothing, and, as several of the others had by this time come out on the ice and could also discover nothing, we scrambled on board again. It is extraordinary, all the sounds that one can fancy one hears out on that great, still space, mysteriously lighted by the twinkling stars.

"Friday, December 15th. This morning Peter saw

a fox on the ice astern, and he saw it again later, when he was out with the dogs. There is something remarkable about this appearance of bears and foxes now, after our seeing no life for so long. The last time we saw a fox we were far south of this, possibly near Sannikoff Land. Can we have come into the neighbourhood of land again?

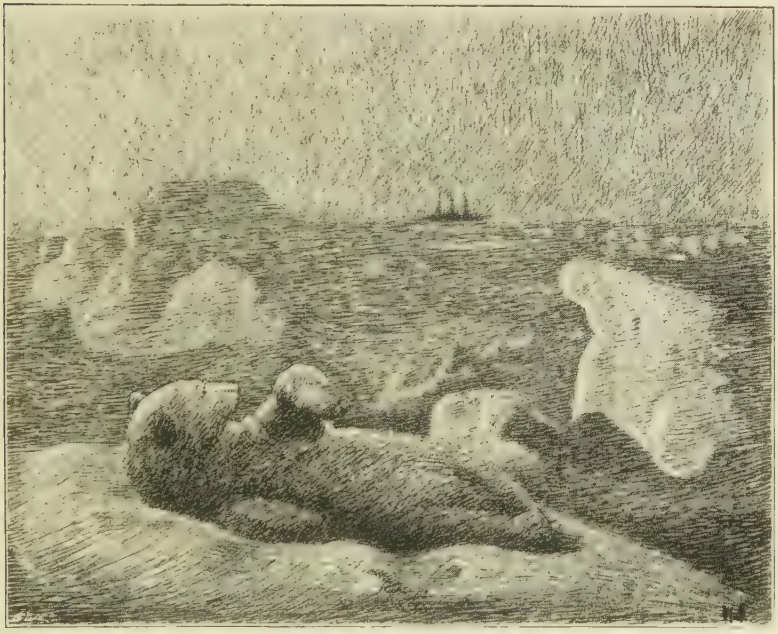
"I inspected 'Kvik's' pups in the afternoon. There were thirteen, a curious coincidence—thirteen pups on December 13th, for thirteen men. Five were killed; 'Kvik' can manage eight, but more would be bad for her. Poor mother! she was very anxious about her young ones, wanted to jump up into the box beside them and take them from us. And you can see that she is very proud of them.

"Peter came this evening and said that there must be a ghost on the ice, for he heard exactly the same sounds of walking and pawing as yesterday evening. This seems to be a populous region, after all.

"According to an observation taken on Tuesday, we must be pretty nearly in 79° 8′ north latitude. That was 8′ drift in the three days from Saturday; we are getting on better and better.

"Why will it not snow? Christmas is near, and what is Christmas without snow, thickly falling snow? We have not had one snowfall all the time we have been drifting. The hard grains that come down now and again are nothing. Oh, the beautiful white snow, falling so gently and silently, softening every hard outline with

its sheltering purity! There is nothing more deliciously restful, soft, and white. This snowless ice-plain is like a life without love—nothing to soften it. The marks of all the battles and pressures of the ice stand forth just as when they were made, rugged and difficult to move



By H. Egidius] A NOCTURNAL VISITANT. [*From a Photograph.*

among. Love is life's snow. It falls deepest and softest into the gashes left by the fight—whiter and purer than snow itself. What is life without love? It is like this ice—a cold, bare, rugged mass, the wind driving it and rending it and then forcing it together

again, nothing to cover over the open rifts, nothing to break the violence of the collisions, nothing to round away the sharp corners of the broken floes—nothing, nothing but bare, rugged drift-ice.

"Saturday, December 16th. In the afternoon Peter came quietly into the saloon, and said that he heard all sorts of noises on the ice. There was a sound to the north exactly like that of ice packing against land, and then suddenly there was such a roar through the air that the dogs started up and barked. Poor Peter! They laugh at him when he comes down to give an account of his many observations; but there is not one among us as sharp as he is.

"Wednesday, December 20th. As I was sitting at breakfast, Peter came roaring that he believed he had seen a bear on the ice. 'And that "Pan" set off the moment he was loosed.' I rushed on to the ice with my gun. Several men were to be seen in the moonlight, but no bear. It was long before Pan came back; he had followed him far to the north-west.

"Sverdrup and 'Smith Lars' in partnership have made a great bear-trap, which was put out on the ice to-day. As I was afraid of more dogs than bears being caught in it, it was hung from a gallows, too high for the dogs to jump up to the piece of blubber which hangs as bait right in the mouth of the trap. All the dogs spend the evening now sitting on the rail barking at this new man they see out there on the ice in the moonlight.

SVERDRUP'S BEAR-TRAP (MOONLIGHT). 20 DECEMBER, 1893.

From a photograph.)

"Thursday, December 21st. It is extraordinary, after all, how the time passes. Here we are at the shortest day, though *we* have no day. But now we are moving on to light and summer again. We tried to sound to-day; had out 2,100 metres (over 1,100 fathoms) of line without reaching the bottom. We have no more line; what is to be done? Who could have guessed that we should find such deep water? There has been an arch of light in the sky all day, opposite the moon; so it is a lunar rainbow, but without colours, so far as I have been able to see.

"Friday, December 22nd. A bear was shot last night. Jacobsen saw it first, during his watch. He shot at it. It made off; and he then went down and told about it in the cabin. Mogstad and Peter came on deck; Sverdrup was called, too, and came up a little later. They saw the bear on his way towards the ship again; but he suddenly caught sight of the gallows with the trap on the ice to the west, and went off there. He looked well at the apparatus, then raised himself cautiously on his hind-legs, and laid his right paw on the cross-beam just beside the trap, stared for a little, hesitating, at the delicious morsel, but did not at all like the ugly jaws round it. Sverdrup was by this time out at the deck-house, watching in the sparkling moonshine. His heart was jumping—he expected every moment to hear the snap of his trap. But the bear shook his head suspiciously, lowered himself cautiously on to all-fours again,

and snuffed carefully at the wire that the trap was fastened by, following it along to where it was made fast to a great block of ice. He went round this, and saw how cleverly it was all arranged, then slowly followed the

"HE STARED, HESITATING, AT THE DELICIOUS MORSEL."
(Drawn by H. Egidius.)

wire back, raised himself up as before, with his paw on the beam of the gallows, had a long look at the trap, and shook his head again, probably saying to himself: 'These wily fellows have planned this very cleverly for

me.' Now he resumed his march to the ship. When he was within 60 paces of the bow Peter fired. The bear fell, but jumped up again and made off. Jacobsen, Sverdrup, and Mogstad all fired now, and he fell among some hummocks. He was flayed at once, and in the skin there was only the hole of one ball, which had gone through him from behind the shoulder-blade. Peter, Jacobsen, and Mogstad all claimed this ball. Sverdrup gave up his claim, as he had stood so far astern. Mogstad, seeing the bear fall directly after his shot, called out, 'I gave him that one;' Jacobsen swears that it was he that hit; and Bentzen, who was standing looking on, is prepared to take his oath anywhere that it was Peter's ball that did the deed. The dispute upon this weighty point remained unsettled during the whole course of the expedition.

"Beautiful moonlight. Pressure in several directions. To-day we carried our supply of gun-cotton and cannon and rifle powder on deck. It is safer there than in the hold. In case of fire or other accident, an explosion in the hold might blow the ship's sides out and send us to the bottom before we had time to turn round. Some we put on the forecastle, some on the bridge. From these places it would be quickly thrown on to the ice.

"Saturday, December 23rd. What we call in Norway 'Little Christmas Eve.' I went a long way west this morning, coming home late. There was packed up ice everywhere, with flat floes between. I was turned

by a newly formed opening in the ice, which I dared not cross on the thin layer of fresh ice. In the afternoon, as a first Christmas entertainment, we tried an ice-blasting with four prisms of gun-cotton. A hole was made with one of the large iron drills we had brought with us for this purpose, and the charge, with the end of the electric connecting wire, was sunk about a foot below the surface of the ice. Then all retired, the knob was touched, there was a dull crash, and water and pieces of ice were shot up into the air. Although it was 60 yards off, it gave the ship a good jerk that shook everything on board, and brought the hoar-frost down from the rigging. The explosion blew a hole through the four-feet-thick ice, but its only other effect was to make small cracks round this hole.

"Sunday, December 24th. Christmas Eve. 67° of cold (−37° C.). Glittering moonlight and the endless stillness of the Arctic night. I took a solitary stroll over the ice. The first Christmas Eve, and how far away! The observation shows us to be in 79° 11′ north latitude. There is no drift; 2′ farther south than six days ago."

There are no further particulars given of this day in the diary, but when I think of it, how clearly it all comes back to me! There was a peculiar elevation of mood on board that was not at all common among us. Every man's inmost thoughts were with those at home, but his comrades were not to know that, and so there was more

joking and laughing than usual. All the lamps and lights we had on board were lit, and every corner of the saloon and cabins was brilliantly illuminated. The bill of fare for the day, of course, surpassed any previous one—food was the chief thing we had to hold festival with. The dinner was a very fine one indeed; so was the supper, and after it piles of Christmas cakes came on the table; Juell had been busy making them for several weeks. After that we enjoyed a glass of toddy and a cigar, smoking in the saloon being, of course, allowed. The culminating point of the festival came when two boxes with Christmas presents were produced. The one was from Hansen's mother, the other from his *fiancée*—Miss Fougner. It was touching to see the childlike pleasure with which each man received his gift—it might be a pipe or a knife or some little knick-knack—he felt that it was like a message from home. After this there were speeches; and then the *Framsjaa* appeared, with an illustrated supplement, selections from which are given. The drawings are the work of the famous Arctic draughtsman, Huttetu. Here are two verses from the poem for the day:—

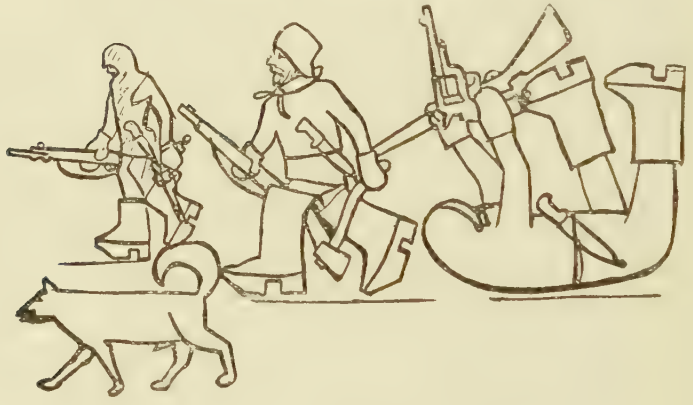
"When the ship's path is stopped by fathom-thick ice,
And winter's white covering is spread,
When we're quite given up to the power of the stream,
Oh! 'tis then that so often of home we must dream.

"We wish them all joy at this sweet Christmas-tide,
Health and happiness for the next year,

Ourselves patience to wait; 'twill bring us to the Pole,
And home the next spring, never fear!"

There were many more poems, amongst others one giving some account of the principal events of the last weeks, in this style:—

"Bears are seen, and dogs are born,
Cakes are baked, both small and large;
Henriksen, he does not fall,
Spite of bear's most violent charge;
Mogstad with his rifle clicks,
Jacobsen with long lance sticks,"

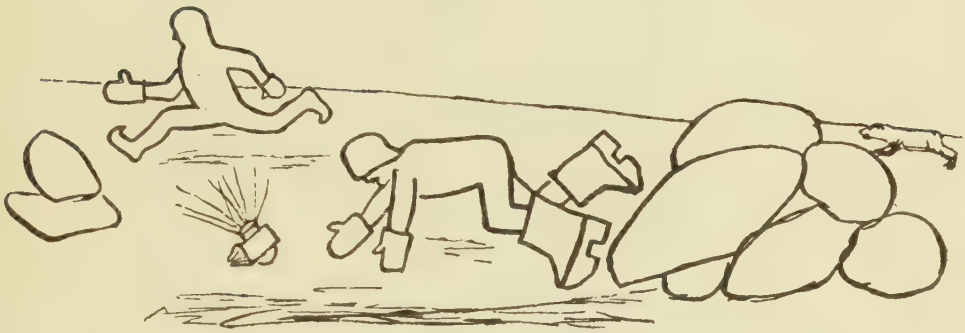


ILLUSTRATIONS FROM THE "FRAMSJAA."
I.—PROMENADE IN TIMES OF PEACE, WITH SVERDRUP'S PATENT FOOT-GEAR.

and so on. There was a long ditty on the subject of the "Dog Rape on board the *Fram*:"—

"Up and down on a night so cold,
Kvirre virre vip, bom, bom,

Walk harpooner and kennelman bold,
Kvirre virre vip, bom, bom ;



II.—FRAM–FELLOWS ON THE WARPATH: DIFFERENCE BETWEEN THE SVERDRUP AND THE LAPP FOOT–GEAR.

III.—FRAM–FELLOWS STILL ON THE WARPATH.

Our kennelman swings, I need hardly tell,
Kvirre virre vip, bom, bom,

The long, long lash you know so well,
Kvirre virre vip, bom, bom ;
Our harpooner, he is a man of light,
Kvirre virre vip, bom bom,
A burning lantern he grasps tight,
Kvirre virre vip, bom, bom,
They as they walk the time beguile,
Kvirre virre vip, bom, bom,
With tales of bears and all their wile,
Kvirre virre vip, bom, bom.

"Now suddenly a bear they see,
Kvirre virre vip, bom, bom,
Before whom all the dogs do flee,
Kvirre virre vip, bom, bom ;
Kennelman, like a deer, runs fast,
Kvirre virre vip, bom, bom,
Harpooner slow comes in the last,
Kvirre virre vip, bom, bom,"

and so on.

Among the announcements are—

"Instruction in Fencing.

"In consequence of the indefinite postponement of our departure, a limited number of pupils can be received for instruction in both fencing and boxing.

"Majakoft,
"Teacher of Boxing,
"Next door to the Doctor's."

Again—

"On account of want of storage room, a quantity of old clothes are at present for sale, by private arrangement, at No. 2, Pump Lane.* Repeated requests to remove them having been of no effect, I am

* This was the nickname of the starboard four-berth cabin.

obliged to dispose of them in this way. The clothes are quite fresh, having been in salt for a long time."

After the reading of the newspaper came instrumental music and singing, and it was far on in the night before we sought our berths.

"Monday, December 25th. Christmas Day. Thermometer at — 36° F. (— 38° C.) below zero. I took a walk south in the beautiful light of the full moon. At a newly made crack I went through the fresh ice with one leg and got soaked; but such an accident matters very little in this frost. The water immediately stiffens into ice; it does not make one very cold, and one feels dry again soon.

"They will be thinking much of us just now at home and giving many a pitying sigh over all the hardships we are enduring in this cold, cheerless, icy region. But I am afraid their compassion would cool if they could look in upon us, hear the merriment that goes on, and see all our comforts and good cheer. They can hardly be better off at home. I myself have certainly never lived a more sybaritic life, and have never had more reason to fear the consequences it brings in its train. Just listen to to-day's dinner menu:—

1. Ox-tail soup;
2. Fish-pudding, with potatoes and melted butter;
3. Roast of reindeer, with peas, French beans, potatoes, and cranberry jam;
4. Cloudberries with cream;
5. Cake and marzipan (a welcome present from the baker to the expedition; we blessed that man).

And along with all this that Ringnes bock-beer which is so famous in our part of the world. Was this the sort of dinner for men who are to be hardened against the horrors of the Arctic night?

"Every one had eaten so much that supper had to be skipped altogether. Later in the evening coffee was served, with pine-apple preserve, gingerbread, vanilla-cakes, cocoanut macaroons, and various other cakes, all the work of our excellent cook, Juell; and we ended up with figs, almonds, and raisins.

"Now let us have the breakfast, just to complete the day: coffee, freshly baked bread, beautiful Danish butter, Christmas cake, Cheddar cheese, clove-cheese, tongue, corned beef, and marmalade. And if any one thinks that this is a specially good breakfast because it is Christmas Day, he is wrong. It is just what we have always, with the addition of the cake, which is not part of the every-day diet.

"Add now to this good cheer our strongly built, safe house, our comfortable saloon, lighted up with the large petroleum lamp and several smaller ones (when we have no electric light), constant gaiety, card-playing, and books in any quantity, with or without illustrations, good and entertaining reading, and then a good sound sleep—what more could one wish?

". . . . But, O Arctic night, thou art like a woman, a marvellously lovely woman. Thine are the noble, pure outlines of antique beauty, with its marble coldness.

On thy high, smooth brow, clear with the clearness of ether, is no trace of compassion for the little sufferings of despised humanity, on thy pale, beautiful cheek no blush of feeling. Among thy raven locks, waving out into space, the hoar-frost has sprinkled its glittering crystals. The proud lines of thy throat, thy shoulders' curves, are so noble, but, oh! unbendingly cold; thy bosom's white chastity is feelingless as the snowy ice. Chaste, beautiful, and proud, thou floatest through ether over the frozen sea, thy glittering garment, woven of aurora beams, covering the vault of heaven. But sometimes I divine a twitch of pain on thy lips, and endless sadness dreams in thy dark eye.

"Oh, how tired I am of thy cold beauty! I long to return to life. Let me get home again, as conqueror or as beggar; what does that matter? But let me get home to begin life anew. The years are passing here, and what do they bring? Nothing but dust, dry dust, which the first wind blows away; new dust comes in its place, and the next wind takes it too. Truth? Why should we always make so much of truth? Life is more than cold truth, and we live but once.

"Tuesday, December 26th. 36° F. below zero (— 38° C.). This (the same as yesterday's) is the greatest cold we have had yet. I went a long way north to-day; found a big lane covered with newly frozen ice, with a quite open piece of water in the middle. The ice rocked up and down under my steps, sending waves out into the open

pool. It was strange once more to see the moonlight

"IT WAS STRANGE ONCE MORE TO SEE THE MOONLIGHT PLAYING ON THE COAL–BLACK WAVES."
(From a Photograph.)

playing on the coal-black waves, and awakened a remembrance of well-known scenes. I followed this

THE WANING POLAR DAY, 22nd September 1893. Pastel Sketch.

(The original was injured by damp.)

lane far to the north, seemed to see the outlines of high land in the hazy light below the moon, and went on and on; but in the end it turned out to be a bank of clouds behind the moonlit vapour rising from the open water. I saw from a high hummock that this opening stretched north as far as the eye could reach.

"The same luxurious living as yesterday; a dinner of four courses. Shooting with darts at a target for cigarettes has been the great excitement of the day. Darts and target are Johansen's Christmas present from Miss Fougner."

"Wednesday, December 27th. Wind began to blow this afternoon, 19½ to 26 feet per second; the windmill is going again, and the arc-lamp once more brightens our lives. Johansen gave notice of 'a shooting match by electric light, with free concert,' for the evening. It was a pity for himself that he did, for he and several others were shot into bankruptcy and beggary, and had to retire one after the other, leaving their cigarettes behind them."

"Thursday, December 28th. A little forward of the *Fram* there is a broad, newly formed open lane, in which she could lie crossways. It was covered with last night's ice, in which slight pressure began to-day. It is strange how indifferent we are to this pressure, which was the cause of such great trouble to many earlier Arctic navigators. We have not so much as made the smallest preparation for possible accident, no provisions

on deck, no tent, no clothing, in readiness. This may seem like recklessness, but in reality there is not the slightest prospect of the pressure harming us ; we know now what the *Fram* can bear. Proud of our splendid, strong ship, we stand on her deck watching the ice come hurtling against her sides, being crushed and broken there and having to go down below her, while new ice-masses tumble upon her out of the dark, to meet the same fate. Here and there, amid deafening noise, some great mass rises up and launches itself threateningly upon the bulwarks, only to sink down suddenly, dragged the same way as the others. But at times when one hears the roaring of tremendous pressure in the night, as a rule so deathly still, one cannot but call to mind the disasters that this uncontrollable power has wrought.

" I am reading the story of Kane's expedition just now. Unfortunate man, his preparations were miserably inadequate ; it seems to me to have been a reckless, unjustifiable proceeding to set out with such equipments. Almost all the dogs died of bad food ; all the men had scurvy from the same cause, with snow-blindness, frost-bites, and all kinds of miseries. He learned a wholesome awe of the Arctic night, and one can hardly wonder at it. He writes on page 173 : ' I feel that we are fighting the battle of life at disadvantage, and that an Arctic day and an Arctic night age a man more rapidly and harshly than a year anywhere else in this

weary world. In another place he writes that it is impossible for civilised men not to suffer in such circumstances. These were sad, but by no means unique experiences. An English Arctic explorer, with whom I had some conversation, also expressed himself very discouragingly on the subject of life in the Polar regions, and combated my cheerful faith in the possibility of preventing scurvy. He was of opinion that it was inevitable, and that no expedition yet had escaped it, though some might have given it another name ; rather a humiliating view to take of the matter, I think. But I am fortunately in a position to maintain that it is not justified ; and I wonder if they would not both change their opinions if they were here. For my own part, I can say that the Arctic night has had no ageing, no weakening, influence of any kind upon me ; I seem, on the contrary, to grow younger. This quiet, regular life suits me remarkably well, and I cannot remember a time when I was in better bodily health balance than I am at present. I differ from these other authorities to the extent of feeling inclined to recommend this region as an excellent sanatorium in cases of nervousness and general breakdown. This is in all sincerity.

" I am almost ashamed of the life we lead, with none of those darkly painted sufferings of the long winter night which are indispensable to a properly exciting Arctic expedition. We shall have nothing to write about when we get home. I may say the same of my comrades as I

have said for myself: they all look healthy, fat, in good condition; none of the traditional pale, hollow faces; no low spirits—any one hearing the laughter that goes on in the saloon, 'the fall of greasy cards,' etc. (*see* Juell's poem), would be in no doubt about this. But how, indeed, should there be any illness? With the best

A GAME OF HALMA.

of food of every kind, as much of it as we want, and constant variety, so that even the most fastidious cannot tire of it, good shelter, good clothing, good ventilation, exercise in the open air *ad libitum*, no over-exertion in the way of work, instructive and amusing books of every kind, relaxation in the shape of cards, chess,

dominoes, halma, music, and story-telling—how should any one be ill? Every now and then I hear remarks expressive of perfect satisfaction with the life. Truly the whole secret lies in arranging things sensibly, and especially in being careful about the food. A thing that I believe has a good effect upon us is this living together in the one saloon, with everything in common. So far as I know, it is the first time that such a thing has been tried, but it is quite to be recommended. I have heard some of the men complain of sleeplessness. This is generally considered to be one inevitable consequence of the Arctic darkness. As far as I am personally concerned I can say that I have felt nothing of it; I sleep soundly at night. I have no great belief in this sleeplessness, but then I do not take an after-dinner nap, which most of the others are addicted to; and if they sleep for several hours during the day, they can hardly expect to sleep all night as well. 'One must be awake part of one's time,' as Sverdrup said."

"Sunday, December 31st. And now the last day of the year has come, it has been a long year, and has brought much both of good and bad. It began with good, by bringing little Liv, such a new, strange happiness that at first I could hardly believe in it. But hard, unspeakably hard, was the parting that came later; no year has brought worse pain than that. And the time since has been one great longing.

"'Would'st thou be free from care and pain?
Thou must love nothing here on earth.'

"But longing—Oh, there are worse things than that! All that is good and beautiful may flourish in its shelter. Everything would be over if we cease to long.

"But you fell off at the end, old year; you hardly carried us so far as you ought. Still you might have done worse; you have not been so bad after all. Have not all hopes and calculations been justified, and are we not drifting away just where I wished and hoped we should be? Only one thing has been amiss—I did not think the drift would have gone in quite so many zig-zags.

"One could not have a more beautiful New Year's Eve. The aurora borealis is burning in wonderful colours and bands of light over the whole sky, but particularly in the north. Thousands of stars sparkle in the blue firmament among the northern lights. On every side the ice stretches endless and silent into the night. The rime-covered rigging of the *Fram* stands out sharp and dark against the shining sky."

The newspaper was read aloud; only verses this time; among other poems the following:—

"TO THE NEW YEAR.

"And you, my boy, must give yourself trouble
Of your old father to be the double;
Your lineage, honour, and fight hard to merit
Our praise for the habits we trust you inherit.

On we must go if you want to please us ;
To make us lie still is the way to tease us.
In the old year we sailed not so badly,
Be it so still, or you'll hear us groan sadly.
When the time comes you must break up the ice for us ;
When the time comes you must win the great prize for us ;
We fervently hope, having reached our great goal,
To eat next Christmas dinner beyond the North Pole."

During the evening we were regaled with pine-apple, figs, cakes, and other sweets, and about midnight Hansen brought in toddy, and Nordahl cigars and cigarettes. At the moment of the passing of the year all stood up, and I had to make an apology for a speech—to the effect that the old year had been after all a good one, and I hoped the new would not be worse ; that I thanked them for good comradeship, and was sure that our life together this year would be as comfortable and pleasant as it had been during the last. Then they sang the songs that had been written for the farewell entertainments given to us at Christiania and at Bergen :—

" Our mother, weep not ! it was thou
Gave them the wish to wander ;
To leave our coasts and turn their prow
Towards night and perils yonder.
Thou pointed'st to the open sea,
The long cape was thy finger ;
The white sail wings they got from thee ;
Thou canst not bid them linger !

"Yes, they are thine, O mother old!
And proud thou dost embrace them;
Thou hear'st of dangers manifold,
But know'st thy sons can face them.
And tears of joy thine eyes will rain,
The day the *Fram* comes steering
Up fjord again to music strain,
And the roar of thousands cheering.

"E. N."

Then I read aloud our last greeting, a telegram we received at Tromsö from Moltke Moe :—

"Luck on the way,
Sun on the sea,
Sun on your minds,
Help from the winds;
May the packed floes
Part and unclose
Where the ship goes.
Forward her progress be,
E'en though the silent sea
Then
After her freeze up again.

"Strength enough, meat enough,
Hope enough, heat enough;
The *Fram* will go sure enough then
To the Pole and so back to the dwellings of men.
Luck on the way
To thee and thy band.
And welcome back to the fatherland!"

After this we read some of Vinje's poems, and then sang songs from the *Framsjaa* and others.

It seems strange that we should have seen the New Year in already, and that it will not begin at home for eight hours yet. It is almost 4 a.m. now. I had thought of sitting up till it was New Year in Norway too; but no, I will rather go to bed and sleep, and dream that I am at home.

"Monday, January 1st, 1894. The year began well. I was awakened by Juell's cheerful voice wishing me a Happy New Year. He had come to give me a cup of coffee in bed—delicious Turkish coffee, his Christmas present from Miss Fougner. It is beautiful clear weather, with the thermometer at 36° below zero (— 38° C.). It almost seems to me as if the twilight in the south were beginning to grow; the upper edge of it to-day was 14° above the horizon."

An extra good dinner at 6 p.m.

1. Tomato soup.
2. Cod roe with melted butter and potatoes.
3. Roast reindeer, with green peas, potatoes, and cranberry jam.
4. Cloudberries with milk.

Ringnes beer.

I do not know if this begins to give any impression of great sufferings and privations? I am lying in my berth, writing, reading, and dreaming. It is always a curious feeling to write for the first time the number of a New Year. Not till then does one grasp the fact that the old year is a thing of the past; the new one is here, and one must prepare to wrestle with it. Who knows what it is

bringing? Good and evil, no doubt, but most good. It cannot but be that we shall go forward towards our goal, and towards home.

"Life is rich and wreathed in roses;
Gaze forth into a world of dreams."

Yes, lead us, if not to our goal—that would be too early—at least towards it; strengthen our hope; but perhaps—no, no perhaps. These brave boys of mine deserve to succeed. There is not a doubt in their minds. Each one's whole heart is set on getting north; I can read it in their faces—it shines from every eye. There is one sigh of disappointment every time that we hear that we are drifting south, one sigh of relief when we begin to go north again, to the unknown. And it is in me and my theories that they trust. What if I have been mistaken, and am leading them astray? Oh, I could not help myself! We are the tools of powers beyond us. We are born under lucky or unlucky stars. Till now I have lived under a lucky one; is its light to be darkened? I am superstitious, no doubt, but I believe in my star. And Norway, our fatherland, what has the old year brought to thee, and what is the new year bringing? Vain to think of that; but I look at our pictures, the gifts of Werenskjold, Munthe, Kitty Kielland, Skredsvig, Hansteen, Eilif Pettersen, and I am at home, at home!

"Wednesday, January 3rd. The old lane about 1,300 feet ahead of the *Fram* has opened again—a large rift,

with a coating of ice and rime. As soon as ice is formed in this temperature, the frost forces it to throw out its salinity on the surface, and this itself freezes into pretty salt flowers, resembling hoar-frost. The temperature is between 38° F. (—39° C.) and 40° F. (—40° C.) below zero, but when there is added to this a biting wind, with a velocity of from 9 to 16 feet per second, it must be allowed that it is rather 'cool in the shade.'"

"Sverdrup and I agreed to-day that the Christmas holidays had better stop now, and the usual life begin again; too much idleness is not good for us. It cannot be called a full nor a complicated one, this life of ours, but it has one advantage, that we are all satisfied with it, such as it is."

"They are still working in the engine-room, but expect to finish what they are doing to the boiler in a few days, and then all is done there. Then the turning lathe is to be set up in the hold, and tools for it have to be forged. There is often a job for Smith Lars, and then the forge flames forward by the forecastle, and sends its red glow on to the rime-covered rigging, and farther up into the starry night, and out over the waste of ice. From far off you can hear the strokes on the anvil ringing through the silent night. When one is wandering alone out there, and the well known sound reaches one's ear, and one sees the red glow, memory recalls less solitary scenes. While one stands gazing, perhaps a light moves along the deck, and

slowly up the rigging. It is Johansen, on his way up to the crow's-nest to read the temperature. Blessing is at present engaged in counting blood corpuscles again, and estimating amounts of hæmoglobin. For this purpose he draws blood every month from every mother's son of us, the bloodthirsty dog, with supreme contempt for all the outcry against vivisection. Hansen and his assistant take observations. The meteorological ones, which are taken every four hours, are Johansen's special department. First he reads the thermometer, hygrometer, and thermograph on deck (they were afterwards kept on the ice); next the barometer, barograph, and thermometer in the saloon; and then the minimum and maximum thermometers in the crow's-nest (this to take the record of the temperature of a higher air stratum). Then he goes to read the thermometers that are kept on the ice to measure the radiations from its surface, and perhaps down to the hold, too, to see what the temperature is there. Every second day, as a rule, astronomical observations are taken, to decide our whereabouts, and keep us up to date in the crab's progress we are making. Taking these observations with the thermometer between 22° F. and 40° F. below zero (— 30° C. to — 40° C.) is a very mixed pleasure. Standing still on deck working with these fine instruments and screwing in metal screws with one's bare fingers is not altogether agreeable. It often happens that they must slap their arms about and tramp hard up and down the deck. They are received with

shouts of laughter when they reappear in the saloon after the performance of one of these thundering nigger break-downs above our heads, that has shaken the whole ship. We ask innocently if it was cold on deck? 'Not the very least,' says Hansen; 'just a pleasant temperature.' 'And your feet are not cold now?' 'No, I can't say that they are, but one's fingers get a little cold sometimes.' Two of his had just been frost-bitten; but he refused to wear one of the wolf-skin suits which I had given out for the meteorologists. 'It is too mild for that yet; and it does not do to pamper one's-self,' he says.

"I believe it was when the thermometer stood at 40° below zero that Hansen rushed up on deck one morning in shirt and drawers to take an observation. He said he had not time to get on his clothes.

"At certain intervals they also take magnetic observations on the ice, these two. I watch them standing there with lanterns, bending over their instruments; and presently I see them tearing away over the floe, their arms swinging like the sails of the windmill when there is a wind pressure of 32 to 39 feet—but 'it is not at all cold.' I cannot help thinking of what I have read in the accounts of some of the earlier expeditions, namely, that at such temperatures it was impossible to take observations. It would take worse than this to make these fellows give in. In the intervals between their observations and calculations I hear a murmuring in Hansen's cabin, which means that the principal is at

present occupied in inflicting a dose of astronomy or navigation upon his assistant.

"It is something dreadful the amount of card-playing that goes on in the saloon in the evenings now; the gaming demon is abroad, far into the night; even our model Sverdrup is possessed by him. They have not yet played the shirts off their backs, but some of them have literally played the bread out of their mouths; two poor wretches have had to go without fresh bread for a whole month because they had forfeited their rations of it to their opponents. But all the same, this card-playing is a healthy, harmless recreation, giving occasion for much laughter, fun, and pleasure.

"An Irish proverb says: 'Be happy; and if you cannot be happy, be careless; and if you cannot be careless, be as careless as you can.' This is good philosophy, which—no, what need of proverbs here, where life *is* happy! It was in all sincerity that Amundsen burst out yesterday with: 'Yes, isn't it just as I say, that we are the luckiest men on earth that can live up here where we have no cares, get everything given us without needing to trouble about it, and are well off in every possible way!' Hansen agreed that it certainly was a life without care. Juell said much the same a little ago; what seems to please him most is that there are no summonses here, no creditors, no bills. And I? Yes, I am happy too. It is an easy life; nothing that weighs heavy on one, no letters, no

newspapers, nothing disturbing; just that monastic, out-of-the-world existence that was my dream when I was younger and yearned for quietness in which to give myself up to my studies. Longing, even when it is strong and sad, is not unhappiness. A man has truly no right to be anything but happy when fate permits him to follow up his ideals, exempting him from the wearing strain of every-day cares, that he may with clearer vision strive towards a lofty goal.

"'Where there is work, success will follow,' said a poet of the land of work. I am working as hard as I can, so I suppose success will pay me a visit by-and-bye. I am lying on the sofa, reading about Kane's misfortunes, drinking beer, smoking cigarettes—truth obliges me to confess that I have become addicted to the vice I condemn so strongly—but flesh is grass; so I blow the smoke clouds into the air and dream sweet dreams. It *is* hard work, but I must do the best I can."

"Thursday, January 4th. It seems as if the twilight were increasing quite perceptibly now, but this is very possibly only imagination. I am in good spirits in spite of the fact that we are drifting south again. After all, what does it matter? Perhaps the gain to science will be as great, and after all, I suppose this desire to reach the North Pole is only a piece of vanity. I have now a very good idea of what it must be like up there. ('I like that!' say you.) Our deep water here is connected with, is a part of, the deep water of the Atlantic

Ocean—of this there can be no doubt. And have not I found that things go exactly as I calculated they would whenever we get a favourable wind? Have not many before us had to wait for wind? And as to vanity —that is a child's disease, got over long ago. All calculations, with but one exception, have proved correct. We made our way along the coast of Asia, which many prophesied we should have great difficulty in doing. We were able to sail farther north than I had dared to hope for in my boldest moments, and in just the longitude I wished. We are closed in by the ice, also as I wished. The *Fram* has borne the ice-pressure splendidly, and allows herself to be lifted by it without so much as creaking, in spite of being more heavily loaded with coal, and drawing more water than we reckoned on when we made our calculations; and this after her certain destruction and ours was prophesied by those most experienced in such matters. I have not found the ice higher nor heavier than I expected it to be; and the comfort, warmth, and good ventilation on board are far beyond my expectations. Nothing is wanting in our equipment, and the food is quite exceptionally good. As Blessing and I agreed a few days ago, it is as good as at home; there is not a thing we long for; not even the thought of a beefsteak à la Châteaubriand, or a pork cutlet with mushrooms, and a bottle of Burgundy, can make our mouths water; we simply don't care about such things. The preparations for the expedition cost me

several years of precious life ; but now I do not grudge them, my object is attained. On the drifting ice we live a winter life, not only in every respect better than that of previous expeditions, but actually as if we had brought a bit of Norway, of Europe, with us. We are as well off as if we were at home. All together in one saloon, with everything in common, we are a little part of the fatherland, and daily we draw closer and closer together. In one point only have my calculations proved incorrect, but unfortunately in one of the most important. I pre-supposed a shallow Polar Sea, the greatest depth known in these regions up till now being 80 fathoms, found by the *Jeannette*. I reasoned that all currents would have a strong influence in the shallow Polar Sea, and that on the Asiatic side the current of the Siberian rivers would be strong enough to drive the ice a good way north. But here I already find a depth which we cannot measure with all our line, a depth of certainly 1,000 fathoms, and possibly double that. This at once upsets all faith in the operation of a current ; we find either none, or an extremely slight one ; my only trust now is in the winds. Columbus discovered America by means of a mistaken calculation, and even that not his own ; heaven only knows where my mistake will lead us. Only I repeat once more—the Siberian driftwood on the coast of Greenland cannot lie, and the way it went we must go.

"Monday, January 8th. Little Liv is a year old to-day ; it will be a fête day at home. As I was lying

on the sofa reading after dinner, Peter put his head in at the door and asked me to come up and look at a strange star which had just shown itself above the horizon, shining like a beacon flame. I got quite a start when I came on deck and saw a strong red light just above the edge of the ice in the south. It twinkled and changed colour; it looked just as if some one were coming carrying a lantern over the ice; I actually believe that for a moment I so far forgot our surroundings as to think that it really was some person approaching from the south. It was Venus, which we see to-day for the first time, as it has till now been beneath the horizon. It is beautiful with its red light. Curious that it should happen to come to-day. It must be Liv's star, as Jupiter is the home star. And Liv's birthday is a lucky day--we are on our way north again. According to observations we are certainly north of 79° N. lat. On the home day, September 6th, the favourable wind began to blow that carried us along the coast of Asia; perhaps Liv's day has brought us into a good current, and we are making the real start for the north under her star.

"Friday, January 12th. There was pressure about ten o'clock this morning in the opening forward, but I could see no movement when I was there a little later. I followed the opening some way to the north. It is pretty cold work walking with the thermometer at 40° F. below zero, and the wind blowing with a velocity of

16 feet per second straight in your face. But now we are certainly drifting fast to the north under Liv's star. After all it is not quite indifferent to me whether we are going north or south. When the drift is northwards new life seems to come into me, and hope, the ever-young, springs fresh and green from under the winter snow. I see the way open before me, and I see the home-coming in the distance—too great happiness to believe in."

"Sunday, January 14th. Sunday again. The time is passing almost quickly, and there is more light every day. There was great excitement to-day when yesterday evening's observations were being calculated. All guessed that we had come a long way north again. Several thought to 79° 18′ or 20′. Others, I believe, insisted on 80°. The calculation places us in 79° 19′ N. lat.; 137° 31′ E. long. A good step onwards. Yesterday the ice was quiet, but this morning there was considerable pressure in several places. Goodness knows what is causing it just now; it is a whole week after new-moon. I took a long walk to the south-west, and got right in among it. Packing began where I stood, with roars and thunders below me and on every side. I jumped, and ran like a hare, as if I had never heard such a thing before; it came so unexpectedly. The ice was curiously flat there to the south; the farther I went the flatter it grew, with excellent sledging surface. Over such ice one could drive many miles a day."

"Monday, January 15th. There was pressure forward both this morning and towards noon, but we heard the loudest sounds from the north. Sverdrup, Mogstad, and Peter went in that direction and were stopped by a large open channel. Peter and I afterwards walked a long distance N.N.E., past a large opening that I had skirted before Christmas. It was shining, flat ice, splendid for sledging on, always better the farther north we went. The longer I wander about and see this sort of ice in all directions, the more strongly does a plan take hold of me that I have long had in my mind. It would be possible to get with dogs and sledges over this ice to the Pole, if one left the ship for good and made one's way back in the direction of Franz Josef Land, Spitzbergen, or the west coast of Greenland. It might almost be called an easy expedition for two men.

"But it would be too hasty to go off in spring. We must first see what kind of drift the summer brings. And as I think over it, I feel doubtful if it would be right to go off and leave the others. Imagine if I came home and they did not! Yet it was to explore the unknown Polar regions that I came; it was for that the Norwegian people gave their money; and surely my first duty is to do that if I can. I must give the drift plan a longer trial yet, but if it takes us in a wrong direction, then there is nothing for it but to try the other, come what may.

"Thursday, January 16th. The ice is quiet to-day. Does longing stupefy one, or does it wear itself out and turn at last into stolidity? Oh, that burning longing night and day was happiness! but now its fire has turned to ice. Why does home seem so far away? It is one's all-life, without it is so empty, so empty—nothing but dead emptiness. Is it the restlessness of spring that is beginning to come over one, the desire for action, for something different from this indolent, enervating life? Is the soul of man nothing but a succession of moods and feelings, shifting as incalculably as the changing winds? Perhaps my brain is over-tired; day and night my thoughts have turned on the one point, the possibility of reaching the Pole and getting home. Perhaps it is rest I need, to sleep, sleep! Am I afraid of venturing my life? No, it cannot be that. But what else then can be keeping me back? Perhaps a secret doubt of the practicability of the plan? My mind is confused; the whole thing has got into a tangle; I am a riddle to myself. I am worn out, and yet I do not feel any special tiredness. Is it perhaps because I sat up reading last night? Everything around is emptiness, and my brain is a blank. I look at the home pictures and am moved by them in a curious, dull way; I look into the future, and feel as if it does not much matter to me whether I get home in the autumn of this year or next. So long as I get home in the end, a year or two seem almost nothing. I have never thought this

before. I have no inclination to read, nor to draw, nor to do anything else whatever. Folly! Shall I try a few pages of Schopenhauer? No, I will go to bed, though I am not sleepy. Perhaps, if the truth were known, I am longing now more than ever. The only thing that helps me is writing, trying to express myself on these pages, and then looking at myself as it were from the outside. Yes, man's life is nothing but a succession of moods, half memory and half hope."

"Thursday, January 18th. The wind that began yesterday has gone on blowing all to-day with a velocity of 16 to 19 feet per second, from S.S.E., S.E., and E.S.E. It has no doubt helped us on a good way north; but it seems to be going down; now, about midnight, it has sunk to 13 feet; and the barometer, which has been rising all the time, has suddenly begun to fall; let us hope that it is not a cyclone passing over us, bringing northerly wind. It is curious that there is almost always a rise of the thermometer with these stronger winds; to-day it rose to 13° F. below zero (— 25° C.). A south wind of less velocity generally lowers the temperature, and a moderate north wind raises it. Payer's explanation of this raising of the temperature by strong winds is that the wind is warmed by passing over large openings in the ice. This can hardly be correct, at any rate in our case, for we have few or no openings. I am rather inclined to believe that the rise is produced by air from higher strata being brought down to the surface of

the earth. It is certain that the higher air is warmer than the lower, which comes into contact with snow and ice surfaces cooled by radiation. Our observations go to prove that such is the case. Add to this that the air in its fall is heated by the rising pressure. A strong wind, even if it does not come from the higher strata of the atmosphere, must necessarily make some confusion in the mutual position of the various strata, mixing the higher with those below them and *vice versâ*.

"I had a strange dream last night. I had got home. I can still feel something of the trembling joy, mixed with fear, with which I neared land and the first telegraph station. I had carried out my plan; we had reached the North Pole on sledges, and then got down to Franz Josef Land. I had seen nothing but drift-ice; and when people asked what it was like up there, and how we knew we had been to the Pole, I had no answer to give; I had forgotten to take accurate observations, and now began to feel that this had been stupid of me. It is very curious that I had an exactly similar dream when we were drifting on the ice-floes along the east coast of Greenland, and thought that we were being carried farther and farther from our destination. Then I dreamed that I had reached home after crossing Greenland on the ice; but that I was ashamed because I could give no account of what I had seen on the way—I had forgotten everything. Is there not a lucky omen in the resemblance between these two dreams? I attained

my aim the first time, bad as things looked—shall I not do so this time, too? If I were superstitious I should feel surer of it; but even though I am not at all superstitious, I have a firm conviction that our enterprise must be successful. This belief is not merely the result of the two last days' south wind; something within me says that we shall succeed; I laugh now at myself for having been weak enough to doubt it. I can spend hours staring into the light, dreaming of how, when we land, I shall grope my way to the first telegraph station, trembling with emotion and suspense. I write out telegram after telegram; I ask the clerk if he can give me any news from home."

"Friday, January 19th. Splendid wind with velocity of 13 to 29 feet per second; we are going north at a grand rate. The red, glowing twilight is now so bright about midday, that, if we were in more southern latitudes, we should expect to see the sun rise bright and glorious above the horizon in a few minutes, but we shall have to wait a month yet for that."

"Saturday, January 20th. I had about 600 lbs. of pemmican and 200 lbs. of bread brought up from the hold to-day, and stowed on the forecastle. It is wrong not to have some provisions on deck against any sudden emergency, such as fire.

"Sunday, January 21st. We took a long excursion to the north-west; the ice in that direction, too, was tolerably flat. Sverdrup and I got on the top of a high

pressure mound at some distance from here. It was in the centre of what had been very violent packing, but all the same the wall at its highest was not over 17 feet, and this was one of the highest and biggest altogether that I have seen yet. An altitude of the moon taken this evening showed us to be in 79° 35′ N. lat.—exactly what I had thought. We are so accustomed now to calculating our drift by the wind, that we are able to tell pretty nearly where we are. This is a good step northwards, if we could take many more such. In honour of the King's birthday we have a treat of figs, raisins, and almonds.

"Tuesday, January 23rd. When I came on deck this morning 'Caiaphas' was sitting out on the ice on the port quarter, barking incessantly to the east. I knew there must be something there, and went off with a revolver, Sverdrup following with one also. When I got near the dog he came to meet me, always wriggling his head round to the east and barking; then he ran on before us in that direction; it was plain that there was some animal there, and of course it could only be a bear. The full moon stood low and red in the north, and sent its feeble light obliquely across the broken ice-surface. I looked out sharply in all directions over the hummocks, which cast long, many-shaped shadows; but I could distinguish nothing in this confusion. We went on, 'Caiaphas' first, growling and barking and pricking his ears, and I after him, expecting every moment to see a bear loom up in front of us. Our course was eastwards

along the opening. The dog presently began to go more cautiously and straighter forward; then he stopped making any noise except a low growl—we were evidently drawing near. I mounted a hummock to look about, and caught sight among the blocks of ice of something dark, which seemed to be coming towards us. 'There comes a black dog,' I called. 'No, it is a bear,' said Sverdrup, who was more to the side of it and could see better. I saw now, too, that it was a large animal, and that it had only been its head that I had taken for a dog. It was not unlike a bear in its movements, but it seemed to me remarkably dark in colour. I pulled the revolver out of the holster and rushed forward to empty all its barrels into the creature's head. When I was just a few paces from it, and preparing to shoot, it raised its head and I saw that it was a walrus, and that same moment it threw itself sideways into the water. There we stood. To shoot at such a fellow with a revolver would be of as much use as squirting water at a goose. The great black head showed again immediately in a strip of moonlight on the dark water. The animal took a long look at us, disappeared for a little, appeared again nearer, bobbed up and down, blew, lay with its head under water, shoved itself over towards us, raised its head again. It was enough to drive one mad: if we had only had a harpoon I could easily have stuck it into its back. Yes, if we had had—and back to the *Fram* we ran as fast as our legs would carry us, to get

harpoon and rifle. But the harpoon and line were stored away, and were not to be had at once; who could have guessed that they would be needed here? The harpoon point had to be sharpened, and all this took time. And for all our searching afterwards east and west along the opening, no walrus was to be found. Goodness knows where it had gone, as there are hardly any openings in the ice for a long distance round. Sverdrup and I vainly fret over not having known at once what kind of animal it was, for if we had only guessed we should have him now. But who expects to meet a walrus on close ice in the middle of a wild sea of a thousand fathoms depth, and that in the heart of winter? None of us ever heard of such a thing before; it is a perfect mystery. As I thought we might have come upon shoals or into the neighbourhood of land, I had soundings taken in the afternoon with 130 fathoms (240 metres) of line, but no bottom was found.

"By yesterday's observations we are in 79° 41′ N. lat., and 135° 29′ E. long. That is good progress north, and it does not much matter that we have been taken a little west. The clouds are driving this evening before a strong south wind, so we shall likely be going before it soon too; in the meantime there is a breeze from the south, so slight that you hardly feel it.

"The opening on our stern lies almost east and west. We could see no end to it westwards when we went

after the walrus; and Mogstad and Peter had gone three miles east, and it was as broad as ever there.

"Wednesday, January 24th. At supper this evening Peter told some of his remarkable Spitzbergen stories — about his comrade Andreas Bek. 'Well, you see, it was up about Dutchman's Island, or Amsterdam Island, that Andreas Bek and I were on shore and got in among all the graves. We thought we'd like to see what was in them, so we broke up some of the coffins, and there they lay. Some of them had still flesh on their jaws and noses, and some of them still had their caps on their heads. Andreas, he was a devil of a fellow, you see, and he broke up the coffins and got hold of the skulls, and rolled them about here and there. Some of them he set up for targets and shot at. Then he wanted to see if there was marrow left in their bones, so he took and broke a thigh-bone — and, sure enough, there was marrow; he took and picked it out with a wooden pin.'

"'How could he do a thing like that?'

"'Oh, it was only a Dutchman, you know. But he had a bad dream that night, had Andreas. All the dead men came to fetch him, and he ran from them and got right out on the bowsprit, and there he sat and yelled, while the dead men stood on the forecastle. And the one with his broken thigh-bone in his hand was foremost, and he came crawling out, and wanted Andreas to put it ogether again. But just then he wakened. We were lying in the same berth, you see,

Andreas and me, and I sat up in the berth and laughed, listening to him yelling. I wouldn't waken him, not I. I thought it was fun to hear him getting paid out a little.'

"'It was bad of you, Peter, to have any part in that horrid plundering of dead bodies.'

"'Oh, I never did anything to them, you know. Just once I broke up a coffin to get wood to make a fire for our coffee; but when we opened it the body just fell to pieces. But it was juicy wood, that, better to burn than the best fir-roots—such a fire as it made!'

"One of the others now remarked, 'Wasn't it the devil that used a skull for his coffee-cup?

"'Well, he hadn't anything else, you see, and he just happened to find one. There was no harm in that, was there?

"Then Jacobsen began to hold forth: 'It's not at all such an uncommon thing to use skulls for shooting at, either because people fancy them for targets, or because of some other reason; they shoot in through the eyeholes,' etc., etc.

"I asked Peter about 'Tobiesen's' coffin—if it had ever been dug up to find out if it was true that his men had killed him and his son.

"'No, that one has never been dug up.'

"'I sailed past there last year,' begins Jacobsen, again; 'I didn't go ashore, but it seems to me that I heard that it had been dug up.'

"'That's just rubbish; it has never been dug up.'

"'Well,' said I, 'it seems to me that I've heard something about it too; I believe it was here on board, and I am very much mistaken if it was not yourself that said it, Peter.'

"'No, I never said that. All I said was that a man once struck a walrus spear through the coffin, and it's sticking there yet.'

"'What did he do that for?'

"'Oh! just because he wanted to know if there was anything in the coffin; and yet he didn't want to open it, you know. But let him lie in peace now.'

"Friday, January 26th. Peter and I went eastwards along the opening this morning for about seven miles, and we saw where it ends, in some old pressure ridges; its whole length is over seven miles. Movement in the ice began on our way home; indeed, there was pretty strong pressure all the time. As we were walking on the new ice in the opening, it rose in furrows or cracked under our feet. Then it raised itself up into two high walls, between which we walked as if along a street, amidst unceasing noises, sometimes howling and whining like a dog complaining of the cold, sometimes a roar like the thunder of a great waterfall. We were often obliged to take refuge on the old ice, either because we came to open water with a confusion of floating blocks, or because the line of the packing had gone straight across the opening, and there was a wall in front of us like a high

frozen wave. It seemed as if the ice on the south side of the opening where the *Fram* is lying, were moving east, or else that on the north side was moving west ; for the floes on the two sides slanted in towards each other in these directions. We saw tracks of a little bear which had trotted along the opening the day before. Unfortunately it had gone off south-west, and we had small hope, with this steady south wind, of its getting scent of the ship and coming to fetch a little of the flesh on board.

"Saturday, January 27th. The days are turning distinctly lighter now. We can just see to read *Verdens Gang** about midday. At that time to-day Sverdrup thought he saw land far astern ; it was dark and irregular, in some places high ; he fancied that it might be only an appearance of clouds. When I returned from a walk, about one o'clock, I went up to look, but saw only piled-up ice. Perhaps this was the same as he saw, or possibly I was too late. (It turned out next day to be only an optical illusion.) Severe pressure has been going on this evening. It began at 7.30 astern in the opening, and went on steadily for two hours. It sounded as if a roaring waterfall were rushing down upon us with a force that nothing could resist. One heard the big floes crashing and breaking against each other. They were flung and pressed up into high walls, which must now stretch along the whole opening east and west, for one

* A Norwegian newspaper.

hears the roar the whole way. It is coming nearer just now ; the ship is getting violent shocks ; it is like waves in the ice. They come on us from behind, and move forward. We stare out into the night, but can see nothing, for it is pitch-dark. Now I hear cracking and shifting in the hummock on the starboard quarter ; it gets louder and stronger, and extends steadily. At last the waterfall roar abates a little. It becomes more unequal ; there is a longer interval between each shock. I am so cold that I creep below.

"But no sooner have I seated myself to write, than the ship begins to heave and tremble again, and I hear through her sides the roar of the packing. As the bear-trap may be in danger, three men go off to see to it, but they find that there is a distance of 50 paces between the new pressure-ridge and the wire by which the trap is secured, so they leave it as it is. The pressure-ridge was an ugly sight, they say, but they could distinguish nothing well in the dark.

"Most violent pressure is beginning again. I must go on deck and look at it. The loud roar meets one as one opens the door. It is coming from the bow now, as well as from the stern. It is clear that pressure-ridges are being thrown up in both openings, so if they reach us we shall be taken by both ends and lifted lightly and gently out of the water. There is pressure near us on all sides. Creaking has begun in the old hummock on the port quarter ; it is getting louder, and, so far

as I can see, the hummock is slowly rising. A lane has opened right across the large floe on the port side; you can see the water, dark as it is. Now both pressure and noise get worse and worse; the ship shakes, and I feel as if I myself were being gently lifted with the stern-rail, where I stand gazing out at the welter of ice-masses, that resemble giant snakes writhing and twisting their great bodies out there under the quiet, starry sky, whose peace is only broken by one aurora serpent waving and flickering restlessly in the north-east. I once more think what a comfort it is to be safe on board the *Fram*, and look out with a certain contempt at the horrible hurly-burly nature is raising to no purpose whatever; it will not crush us in a hurry, nor even frighten us. Suddenly I remember that my fine thermometer is in a hole on a floe to port on the other side of the opening, and must certainly be in danger. I jump on to the ice, find a place where I can leap across the opening, and grope about in the dark until I find the piece of ice covering the hole; I get hold of the string, and the thermometer is saved. I hurry on board again well pleased, and down into my comfortable cabin to smoke a pipe of peace—alas! this vice grows upon me more and more—and to listen with glee to the roar of the pressure outside and feel its shakings, like so many earthquakes, as I sit and write my diary. Safe and comfortable, I cannot but think with deep pity of the

many who have had to stand by on deck in readiness to leave their frail vessels on the occurrence of any such pressure. The poor *Tegethoff* fellows—they had a bad time of it, and yet theirs was a good ship in comparison with many of the others. It is now 11.30, and the noise outside seems to be subsiding.

"It is remarkable that we should have this strong pressure just now, with the moon in its last quarter and neap tide. This does not agree with our previous experiences; no more does the fact that the pressure the day before yesterday was from 12 a.m. to about 2 p.m., and then again at 2 a.m., and now we have had it from 7.30 to 10.30 p.m. Can land have something to do with it here after all? The temperature to-day is 42° F. below zero (−41·4° C.), but there is no wind, and we have not had such pleasant weather for walking for a long time; it feels almost mild here when the air is still.

"No, that was not the end of the pressure. When I was on deck at a quarter to twelve, roaring and trembling began again in the ice forward on the port quarter; then suddenly came one loud boom after another, sounding out in the distance, and the ship gave a start; there was again a little pressure, and after that quietness. Faint aurora borealis.

"Sunday, January 28th. Strange to say, there has been no pressure since 12 o'clock last night; the ice seems perfectly quiet. The pressure-ridge astern showed what violent packing yesterday's was; in one place its

height was 18 or 19 feet above the surface of the water; floe-ice 8 feet thick was broken, pressed up in square blocks, and crushed to pieces. At one point a huge monolith of such floe-ice rose high into the air. Beyond this pressure-wall there was no great disturbance to be detected. There had been a little packing here and there, and the floe to port had four or five large cracks across it, which no doubt accounted for the explosions I heard last night. The ice to starboard was also cracked in several places. The pressure had evidently come from the north or N.N.E. The ridge behind us is one of the highest I have seen yet. I believe that if the *Fram* had been lying there she would have been lifted right out of the water. I walked for some distance in a north-easterly direction, but saw no signs of pressure there.

"Another Sunday. It is wonderful that the time can pass so quickly as it does. For one thing, we are in better spirits, knowing that we are drifting steadily north. A rough estimate of to-day's observation gives 79° 50′ N. lat. That is not much since Monday; but then yesterday and to-day there has been almost no wind at all, and the other days it has been very light, only once or twice with as much as 9 feet velocity, the rest of the time 3 and 6.

"A remarkable event happened yesterday afternoon: I got Munthe's picture of the 'Three Princesses' fastened firmly on the wall. It is a thing that we have been going to do ever since we left Christiania, but we

have never been able to summon up energy for such a heavy undertaking—it meant knocking in four nails—and the picture has amused itself by constantly falling and guillotining whoever happened to be sitting on the sofa below it.

"Tuesday, January 30th. 79° 49′ N. lat., 134° 57′ E. long., is the tale told by this afternoon's observations, while by Sunday afternoon's we were in 79° 50′ N. lat., and 133° 23′ E. long. This fall-off to the south-east again was not more than I had expected, as it has been almost calm since Sunday. I explain the thing to myself thus: When the ice has been set adrift in a certain direction by the wind blowing that way for some time, it gradually in process of drifting becomes more compressed, and when that wind dies away, a reaction in the opposite direction takes place. Such a reaction must, I believe, have been the cause of Saturday's pressure, which stopped entirely as suddenly as it began. Since then there has not been the slightest appearance of movement in the ice. Probably the pressure indicates the time when the drift turned. A light breeze has sprung up this afternoon from S.E. and E.S.E., increasing gradually to almost 'mill wind.' We are going north again; surely we shall get the better of the 80th degree this time.

"Wednesday, January 31st. The wind is whistling among the hummocks; the snow flies rustling through the air; ice and sky are melted into one. It is dark; our

skins are smarting with the cold ; but we are going north at full speed, and are in the wildest of gay spirits.

"Thursday, February 1st. The same sort of weather as yesterday, except that it has turned quite mild—$7\frac{1}{2}°$ F. below zero ($-22°$ C.). The snow is falling exactly as it does in winter weather at home. The wind is more southerly, S.S.E. now, and rather lighter. It may be taken for granted that we have passed the 80th degree, and we had a small preliminary fête this evening—figs, raisins, and almonds—and dart-shooting, which last resulted for me in a timely replenishment of my cigarette case.

"Friday, February 2nd. High festival to-day in honour of the 80th degree, beginning with fresh rye-bread and cake for breakfast. Took a long walk to get up an appetite for dinner. According to this morning's observation, we are in 80° 10′ N. lat. and 132° 10′ E. long. Hurrah! Well sailed! I had offered to bet heavily that we had passed 80°, but no one would take the bet. Dinner menu :—Ox-tail soup, fish pudding, potatoes, rissoles, green peas, haricot beans, cloudberries with milk, and a whole bottle of beer to each man. Coffee and a cigarette after dinner. Could one wish for more? In the evening we had tinned pears and peaches, gingerbread, dried bananas, figs, raisins, and almonds. Complete holiday all day. We read aloud the discussions of this expedition published before we left, and had some good laughs at the many

objections raised. But our people at home, perhaps, do not laugh if they read them now.

"Monday, February 5th. Last time we shall have Ringnes beer at dinner. Day of mourning.

"Tuesday, February 6th. Calm, clear weather. A strong sun-glow above the horizon in the south; yellow, green, and light blue above that; all the rest of the sky deep ultramarine. I stood looking at it, trying to remember if the Italian sky was ever bluer; I do not think so. It is curious that this deep colour should always occur along with cold. Is it perhaps that a current from more northerly, clear regions produces drier and more transparent air in the upper strata? The colour was so remarkable to-day that one could not help noticing it. Striking contrasts to it were formed by the *Fram's* red deck-house and the white snow on roof and rigging. Ice and hummocks were quite violet wherever they were turned from the daylight. This colour was specially strong over the fields of snow upon the floes. The temperature has been 52° F. and 54° F. below zero (— 47° and — 48° C.). There is a sudden change of 125° F. when one comes up from the saloon, where the thermometer is at 72° F. (+ 22° C.); but, although thinly clad and bareheaded, one does not feel it cold, and can even with impunity take hold of the brass door-handle or the steel cable of the rigging. The cold is visible, however; one's breath is like cannon smoke before it is out of one's mouth; and

when a man spits there is quite a little cloud of steam round the fallen moisture. The *Fram* always gives off a mist, which is carried along by the wind, and a man or a dog can be detected far off among the hummocks or pressure-ridges by the pillar of vapour that follows his progress.

"Wednesday, February 7th. It is extraordinary what a frail thing hope, or rather the mind of man, is. There was a little breeze this morning from the N.N.E., only 6 feet per second, thermometer at 57° F. below zero (— 49·6° C.), and immediately one's brow is clouded over, and it becomes a matter of indifference how we get home, so long as we only get home soon. I immediately assume land to the northward from which come these cold winds, with clear atmosphere and frost and bright blue skies, and conclude that this extensive tract of land must form a pole of cold with a constant maximum of air pressure, which will force us south with north-east winds. About midday the air began to grow more hazy, and my mood less gloomy. No doubt there is a south wind coming, but the temperature is still too low for it. Then the temperature, too, rises, and now we can rely on the wind. And this evening it came, sure enough, from S.S.W., and now, 12 p.m., its velocity is 11 feet, and the temperature has risen to 43° F. below zero (—42° C.). This promises well. We should soon reach 81°. The land to the northward has now vanished from my mind's eye.

"We had lime-juice with sugar at dinner to-day instead of beer, and it seemed to be approved of. We call it wine, and we agreed that it was better than cider. Weighing has gone on this evening, and the increase in certain cases is still disquieting. Some have gained as much as 4 pounds in the last month, for instance, Sverdrup, Blessing, and Juell, who beats the record on board with 13 stone. 'I never weighed so much as I do now,' says Blessing, and it is much the same story with us all. Yes, this is a fatiguing expedition, but our menus are always in due proportion to our labours. To-day's dinner: Knorr's bean soup, toad-in-the-hole, potatoes, rice, and milk with cranberry jam. Yesterday's dinner: Fish *au gratin* (hashed fish) with potatoes, curried rabbit with potatoes and French beans, stewed bilberries, and cranberries with milk. At breakfast yesterday we had freshly baked wheat-bread, at breakfast to-day freshly baked rye-bread. These are specimens of our ordinary bills of fare. It is as I expected: I hear the wind roaring in the rigging now; it is going to be a regular storm, according to our ideas of one here.

"Saturday, February 10th. Though that wind the other day did not come to much after all, we still hoped that we had made good way north, and it was consequently an unwelcome surprise when yesterday's observation showed our latitude to be 79° 57′ N., 13′ farther south instead of farther north. It is extraordinary how little inured one gets to disappointments;

the longing begins again ; and again attainment seems so far off, so doubtful. And this though I dream at nights just now of getting out of the ice west of Iceland. Hope is a rickety craft to trust oneself to. I had a long, successful drive with the dogs to-day.

"Sunday, February 11th. To-day we drove out with two teams of dogs. Things went well ; the sledges got on much better over this ice than I thought they would. They do not sink much in the snow. On flat ice four dogs can draw two men.

"Tuesday, February 13th. A long drive south-west yesterday with white dogs. To-day still farther in the same direction on snow-shoes. It is good healthy exercise, with a temperature of 43° F. to 47° F. below zero (— 42° and — 44° C.) and a biting north wind. Nature is so fair and pure, the ice is so spotless, and the lights and shadows of the growing day so beautiful on the new-fallen snow. The *Fram's* hoar-frost-covered rigging rises straight and white with rime towards the sparkling blue sky. One's thoughts turn to the snow-shoeing days at home.

"Thursday, February 15th. I went yesterday on snow-shoes farther north-east than I have ever been before, but I could still see the ship's rigging above the edge of the ice. I was able to go fast, because the ice was flat in that direction. To-day I went the same way with dogs. I am examining the 'lie of the land' all round, and thinking of plans for the future.

"What exaggerated reports of the Arctic cold are in circulation! It was cold in Greenland, and it is not milder here; the general day temperature just now is about 40° F. and 43° F. below zero. I was clothed yesterday as usual as regards the legs—drawers, knickerbockers, stockings, frieze leggings, snow-socks, and moccasins; my body covering consisted of an ordinary shirt, a wolf-skin cape, and a sealskin jacket, and I sweated like a horse. To-day I sat still, driving with only thin ducks above my ordinary leg wear, and on my body woollen shirt, vest, Iceland woollen jersey, a frieze coat, and a sealskin one. I found the temperature quite pleasant, and even perspired a little to-day, too. Both yesterday and to-day I had a red flannel mask on my face, but it made me too warm, and I had to take it off, though there was a bitter breeze from the north. That north wind is still persistent, sometimes with a velocity of 9 or even 13 feet, but yet we do not seem to be drifting south; we lie in 80° N. lat., or even a few minutes farther north. What can be the reason of this? There is a little pressure every day just now. Curious that it should again occur at the moon's change of quarter. The moon stands high in the sky, and there is daylight now, too. Soon the sun will be making his appearance, and when he does we shall hold high festival.

"Friday, February 16th. Hurrah! A meridian observation to-day shows 80° 1′ N. lat., so that we have come a few minutes north since last Friday, and that in

spite of constant northerly winds since Monday. There is something very singular about this. Is it, as I have thought all along from the appearance of the clouds and the haziness of the air, that there has been south wind in the south, preventing the drift of the ice that way, or have we at last come under the influence of a current? That shove we got to the south lately in the face of southerly winds was a remarkable thing, and so is our remaining where we are now in spite of the northerly ones. It would seem that new powers of some kind must be at work.

"To-day another noteworthy thing happened, which was that about midday we saw the sun, or, to be more correct, an image of the sun, for it was only a mirage. A peculiar impression was produced by the sight of that glowing fire lit just above the outermost edge of the ice. According to the enthusiastic descriptions given by many Arctic travellers of the first appearance of this god of life after the long winter night, the impression ought to be one of jubilant excitement; but it was not so in my case. We had not expected to see it for some days yet, so that my feeling was rather one of pain, of disappointment, that we must have drifted farther south than we thought. So it was with pleasure I soon discovered that it could not be the sun itself. The mirage was at first like a flattened-out glowing red streak of fire on the horizon; later there were two streaks, the one above the other, with a dark space

between; and from the main top I could see four, or even five such horizontal lines directly over one another, and all of equal length; as if one could only imagine a square dull-red sun with horizontal dark streaks across it. An astronomical observation we took in the afternoon showed that the sun must in reality have been 2° 22′ below the horizon at noon; we cannot expect to see its disc above the ice before Tuesday at the earliest: it depends on the refraction, which is very strong in this cold air. All the same, we had a small sun-festival this evening, on the occasion of the appearance of its image—a treat of figs, bananas, raisins, almonds, and gingerbread.

"Sunday, February 18th. I went eastwards yesterday on snow-shoes, and found a good snow-shoeing and driving road out to the flats that lie in that direction. There is a pretty bad bit first, with hummocks and pressure-ridges, and then you come out on these great wide plains, which seem to extend for miles and miles to the north, east, and south-east. To-day I drove out there with eight dogs; the driving goes capitally now; some of the others followed on snow-shoes. Still northerly wind. This is slow work; but anyhow we are having clear, bright weather. Yes, it is all very well—we snow-shoe, sledge, read both for instruction and amusement, write, take observations, play cards, chat, smoke, play chess, eat and drink; but all the same it is an execrable life in the long run, this—at least, so it

seems to me at times. When I look at the picture of our beautiful home in the evening light, with my wife standing in the garden, I feel as if it were impossible that this could go on much longer. But only the merciless fates know when we shall stand there together again, feeling all life's sweetness as we look out over the smiling fjord, and . . . . . Taking everything into calculation, if I am to be perfectly honest, I think this is a wretched state of matters. We are now in about 80° N. lat., in September we were in 79°; that is, let us say, one degree for five months. If we go on at this rate we shall be at the Pole in forty-five, or say fifty, months, and in ninety or one hundred months at 80° N. lat. on the other side of it, with probably some prospect of getting out of the ice and home in a month or two more. At best, if things go on as they are doing now, we shall be home in eight years. I remember Brogger writing before I left, when I was planting small bushes and trees in the garden for future generations, that no one knew what length of shadow these trees would cast by the time I came back. Well, they are lying under the winter snow now, but in spring they will shoot and grow again—how often? Oh! at times this inactivity crushes one's very soul; one's life seems as dark as the winter night outside; there is sunlight upon no part of it except the past and the far, far distant future. I feel as if I *must* break through this dead-

ness, this inertia, and find some outlet for my energies. Can't something happen? Could not a hurricane come and tear up this ice, and set it rolling in high waves like the open sea? Welcome danger, if it only brings us the chance of fighting for our lives—only lets us move onwards! The miserable thing is to be inactive onlookers, not to be able to lift a hand to help ourselves forwards. It wants ten times more strength of mind to sit still and trust in your theories and let nature work them out without your being able so much as to lay one stick across another to help, than it does to trust in working them out by your own energy — that is nothing when you have a pair of strong arms. Here I sit, whining like an old woman. Did I not know all this before I started? Things have not gone worse than I expected, but on the contrary, rather better. Where is now the serene hopefulness that spread itself in the daylight and the sun? Where are these proud imaginings now that mounted like young eagles towards the brightness of the future? Like broken-winged, wet crows they leave the sun-lit sea, and hide themselves in the misty marshes of despondency. Perhaps it will all come back again with the south wind; but no—I must go and rummage up one of the old philosophers again.

"There is a little pressure this evening, and an observation just taken seems to indicate a drift of 3′ south.

"11 p.m. Pressure in the opening astern. The ice

is cracking and squeezing against the ship, making it shake.

"Monday, February 19th. Once more it may be said that the night is darkest just before the dawn. Wind began to blow from the south to-day, and has reached a velocity of 13 feet per second. We did some ice-boring this morning, and found that the ice to port is 5 feet $11\frac{5}{8}$ inches (1·875 metres) thick, with a layer of about $1\frac{1}{2}$ inches of snow over it. The ice forward was 6 feet $7\frac{1}{2}$ inches (2·08 metres) thick, but a couple of inches of this was snow. This cannot be called much growth for quite a month, when one thinks that the temperature has been down to 58° F. below zero.

"Both to-day and yesterday we have seen the mirage of the sun again; to-day it was high above the horizon, and almost seemed to assume a round, disc-like form. Some of the others maintain that they have seen the upper edge of the sun itself; Peter and Bentzen that they have seen at least half of the disc and Juell and Hansen declare that the whole of it was above the horizon. I am afraid it is so long since they saw it that they have forgotten what it is like.

"Tuesday, February 20th. Great sun festival to-day without any sun. We felt certain we should see it, but there were clouds on the horizon. However we were not going to be cheated out of our festival; we can hold another on the occasion of really seeing it for the first time. We began with a grand rifle practice in the

morning; then there was a dinner of three or four courses and 'Fram wine,' otherwise lime-juice, coffee afterwards with 'Fram cake.' In the evening pine-apple, cake, figs, bananas, and sweets. We go off to bed feeling that we have over-eaten ourselves, while half a gale from the S.E. is blowing us northwards. The mill has been going to-day, and though the real sun did not come to the festival, our saloon sun lighted up our table both at dinner and supper. Great face-washing in honour of the day. The way we are laying on flesh is getting serious. Several of us are like prize pigs, and the bulge of cook Juell's cheeks, not to mention another part of his body, is quite alarming. I saw him in profile to-day, and wondered how he would ever manage to carry such a corporation over the ice if we should have to turn out one of these fine days. Must begin to think of a course of short rations now.

"Wednesday, February 21st. The south wind continues. Took up the bag-nets to-day which were put out the day before yesterday. In the upper one, which hung near the surface, there were chiefly amphipodæ; in Murray's net, which hung at about 50 fathoms depth, there was a variety of small crustaceæ and other small animals shining with such a strong phosphorescence that the contents of the net looked like glowing embers as I emptied them out in the cook's galley by lamplight. To my astonishment the net-line pointed north-west, though from the wind there ought to be a good northerly

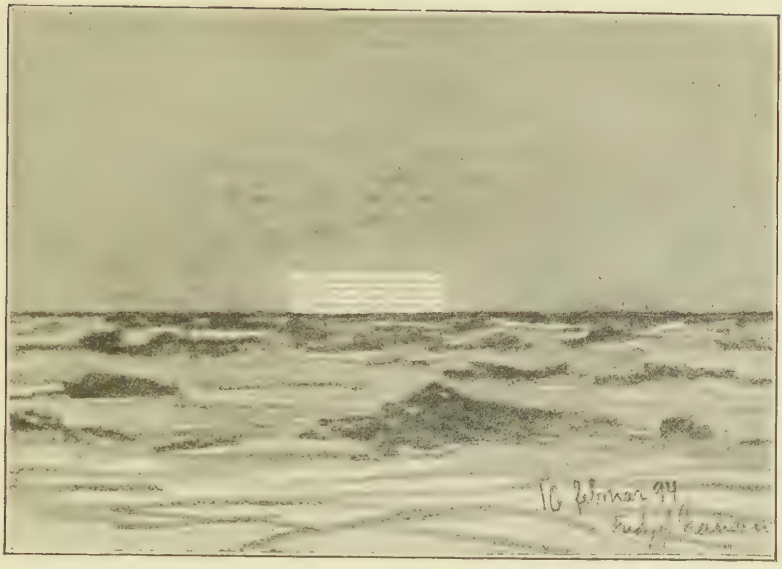
drift. To clear this matter up I let the net down in the afternoon, and as soon as it got a little way under the ice the line pointed north-west again, and continued to do so the whole afternoon. How is this phenomenon to be explained? Can we after all be in a current moving north-west? Let us hope that the future will prove such to be the case. We can reckon on two points of variation in the compass, and in that case the current would make due N.N.W. There seems to be strong movement in the ice. It has opened and formed channels in several places."

"Thursday, February 22nd. The net-line has pointed west all day till now, afternoon, when it is pointing straight up and down, and we are presumably lying still. The wind slackened to-day till it was quite calm in the afternoon. Then there came a faint breeze from the south-west and from the west, and this evening the long-dreaded north-wester has come at last. At 9 p.m. it is blowing pretty hard from N.N.W. An observation of Capella taken in the afternoon would seem to show that we are in any case not farther north than 80° 11′, and this after almost four days' south wind. Whatever can be the meaning of this? Is there dead-water under the ice keeping it from going either forwards or backwards? The ice to starboard cracked yesterday, away beyond the bear trap. The thickness of the solid floe was 11½ feet (3·45° metres), but beside this other ice was packed on to it below. Where it was broken across, the floe

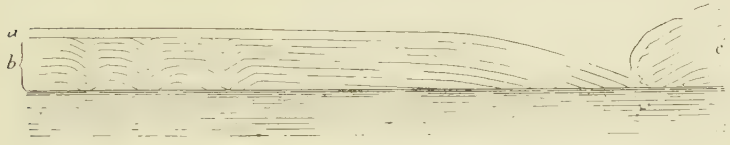
showed a marked stratified formation, recalling the stratification of a glacier. Even the darker and dirtier strata were there, the colour in this case produced by the brownish-red organisms that inhabit the water, specimens of which I found at an earlier date. In several places the strata were bent and broken, exactly in the same manner as the geological strata forming the earth's crust. This was evidently the result of the horizontal pressure in the ice at the time of packing. It was especially noticeable at one place, near a huge mound formed during the last pressure. Here the strata looked very much as they are represented in annexed drawing.*

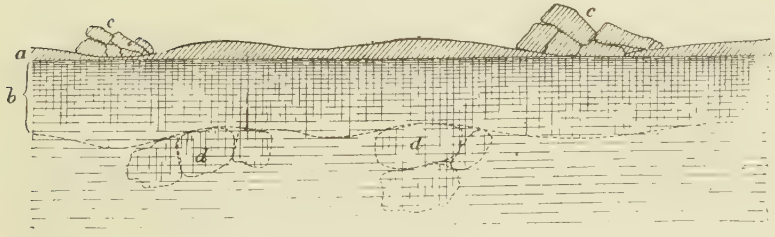
It was extraordinary too to see how this floe of over three yards in thickness was bent into great waves without breaking. This was clearly done by pressure and was specially noticeable more particularly near the pressure-ridges, which had forced the floe down so that its upper surface lay even with the water-line, whilst at other places it was a good half-yard above it, in these last cases thrust up by ice pressed in below. It all shows how extremely plastic these floes are, in spite of the cold; the temperature of the ice near the surface must have been from 4° F. to 22° F. below zero (— 20° to — 30° C.) at the time of these pressures. In many places the bending had been too violent, and the floe had cracked.

* In spite of this bending of the strata, the surface of the ice and snow remained even.



FIRST APPEARANCE OF THE SUN.





ICE STRATIFICATION.

The cracks were often covered with loose ice, so that one could easily enough fall into them, just as in crossing a dangerous glacier.

"Saturday, February 24th. Observations to-day show us to be in 79° 54′ N. lat., 132° 57′ E. long. Strange that we should have come so far south when the north or north-west wind only blew for twenty-four hours.

"Sunday, February 25th. It looks as if the ice were drifting eastwards now. Oh! I see pictures of summer and green trees and rippling streams. I am reading of valley and mountain life, and I grow sick at heart and enervated. Why dwell on such things just now? It will be many a long day before we can see all that again. We are going at the miserable pace of a snail, but not so surely as it goes. We carry our house with us; but what we do one day is undone the next.

"Monday, February 26th. We are drifting north-east. A tremendous snowstorm is going on. The wind has at times a velocity of over 35 feet per second; it is howling in the rigging, whistling over the ice, and the snow is drifting so badly that a man might be lost in it quite near at hand. We are sitting here listening to the howling in the chimney, and in the ventilators, just as if we were sitting in a house at home in Norway. The wings of the windmill have been going round at such a rate that you could hardly distinguish them; but we have had to stop the mill

this evening because the accumulators are full, and we fastened up the wings, so that the wind might not destroy them. We have had electric light for almost a week now.

"This is the strongest wind we have had the whole winter. If anything can shake up the ice and drive us north, this must do it. But the barometer is falling too fast; there will be north wind again presently. Hope has been disappointed too often; it is no longer elastic; and the gale makes no great impression on me. I look forward to spring and summer, in suspense as to what change they will bring. But the Arctic night, the dreaded Arctic night, is over, and we have daylight once again. I must say that I see no appearance of the sunken, wasted faces which this night ought to have produced; in the clearest daylight and the brightest sunshine, I can only discover plump, comfortable-looking ones. It is curious enough though about the light. We used to think it was like real day down here when the incandescent lamps were burning, but now, coming down from the daylight, though they may be all lit, it is like coming into a cellar. When the arc lamp has been burning all day, as it has to-day, and is then put out and its place supplied by the incandescent ones, the effect is much the same."

"Tuesday, February 27th. Drifting E.S.E. My pessimism is justified. A strong west wind has blown almost all day; the barometer is low, but has begun to

rise unsteadily. The temperature is the highest we have had all winter; to-day's maximum is 15° F. above zero (— 9·7° C.). At 8 p.m. the thermometer stood at 7° F. below zero (— 22° C.). The temperature rises and falls almost exactly conversely with the barometer. This afternoon's observation places us in about 80° 10′ N. lat."

"Wednesday, February 28th. Beautiful weather to-day, almost still, and temperature only about 15° F. to 22° F. below zero (— 26° to — 30° 5′ C.). There were clouds in the south, so that not much was to be seen of the sun; but it is light wonderfully long already. Sverdrup and I went snow-shoeing after dinner—the first time this year that we have been able to do anything of the kind in the afternoon. We made attempts to pump yesterday and to-day; there ought to be a little water, but the pump would not suck, though we tried both warm water and salt. Possibly there is water frozen round it, and possibly there is no water at all. In the engine-room there has been no appearance of water for more than a month, and none comes into the forehold, especially now that the bow is raised up by the pack-ice; so if there is any it can only be a little in the hold. This tightening may be attributed chiefly to the frost.

"The wind has begun to blow again from the S.S.W. this evening, and the barometer is falling, which ought to mean good wind coming; but the barometer of

hope does not rise above its normal height. I had a bath this evening in a tin tub in the galley ; trimmed and clean, one feels more of a human being."

"Thursday, March 1st. We are lying almost still. Beautiful mild weather, only $2\frac{1}{2}^{\circ}$ F. below zero (-19° C.), sky overcast ; light fall of snow, and light wind. We made attempts to sound to-day, having lengthened our hemp line with a single strand of steel. This broke off with the lead. We put on a new lead and the whole line ran out, about 2,000 fathoms, without touching bottom, so far as we could make out. In process of hauling in, the steel line broke again. So the results are : no bottom, and two sounding leads, each of 100 lbs. weight, making their way down. Goodness knows if they have reached the bottom yet. I declare I feel inclined to believe that Bentzen is right, and that it is the hole at the earth's axis we are trying to sound."

"Friday, March 2nd. The pups have lived until now in the chart-room, and have done all the mischief there that they could, gnawing the cases of Hansen's instruments, the log-books, etc. They were taken out on deck yesterday for the first time, and to-day they have been there all the morning. They are of an enquiring turn of mind, and examine everything, being specially interested in the interiors of all the kennels in this new large town."

"Sunday, March 4th. The drift is still strong south. There is north-westerly wind to-day again, but not quite

JOHANSEN READING THE ANEMOMETER.

so much of it. I expected we had come a long way south, but yesterday's observation still shows 79° 54′ N. lat. We must have drifted a good way north during the last days before this wind came. The weather yesterday and to-day has been bitter, 35° F. and 36½° F. below zero (−37° and − 38° C.), with sometimes as much as 35 feet of wind per second must be called cool. It is curious that now the northerly winds bring cold, and the southerly warmth. Earlier in the winter it was just the opposite.

"Monday, March 5th. Sverdrup and I have been a long way north-east on snow-shoes. The ice was in good condition for it; the wind has tossed about the snow finely, covering over the pressure-ridge, as far as the scanty supply of material has permitted.

"Tuesday, March 6th. No drift at all. It has been a bitter day to-day, 47° F. to 50° F. below zero (−44° to −46° C.), and wind up to 19 feet. This has been a good occasion for getting hands and face frost-bitten, and one or two have taken advantage of it. Steady north-west wind. I am beginning to get indifferent and stolid as far as the wind is concerned. I photographed Johansen to-day at the anemometer, and during the process his nose was frost-bitten.

"There has been a general weighing this evening again. These weighings are considered very interesting performances, and we stand watching in suspense to see whether each man has gained or lost. Most of them have lost a little this time. Can it be because we have

stopped drinking beer, and begun lime-juice? But Juell goes on indefatigably—he has gained nearly a pound this time. Our doctor generally does very well in this line too, but to-day it is only 10 oz. In other ways he is badly off on board, poor fellow—not a soul will turn ill. In despair he set up a headache yesterday himself, but he could not make it last over the night. Of late he has taken to studying the diseases of dogs; perhaps he may find a more profitable practice in this department.

"Thursday, March 8th. Drifting south. Sverdrup and I had a good snow-shoeing trip to-day, to the north and west. The snow was in splendid condition after the winds; you fly along like thistledown before a breeze, and can get about everywhere, even over the worst pressure-mounds. The weather was beautiful, temperature only 38° F. below zero (−39° C.); but this evening it is quite bitter again, 55° F. (−48·5° C.) and from 16 to 26 feet of wind. It is by no means pleasant work standing up on the windmill, reefing or taking in the sails; it means aching nails, and sometimes frost-bitten cheeks; but it has to be done, and it is done. There is plenty of 'mill-wind' in the daytime now—this is the third week we have had electric light—but it is wretched that it should be always this north and north-west wind; goodness only knows when it is going to stop. *Can* there be land north of us? We are drifting badly south. It is hard to keep one's faith alive. There is nothing for it but to wait and see what time will do.

"After a long rest the ship got a shake this afternoon. I went on deck. Pressure was going on in an opening just in front of the bow. We might almost have expected it just now, as it is new moon; only we have got out of the way of thinking at all about the spring tides, as they have had so little effect lately. They should of course be specially strong just now, as the equinox is approaching.

"Friday, March 9th. The net line pointed slightly south-west this morning; but the line attached to a cheese which was only hanging a few fathoms below the ice to thaw faster, seemed to point in the opposite direction. Had we got a southerly current together with the wind now? H'm! in that case something must come of it! Or was it, perhaps, only the tide setting that way?

"Still the same northerly wind; we are steadily bearing south. This, then, is the change I hoped the March equinox would bring! We have been having northerly winds for more than a fortnight. I cannot conceal from myself any longer that I am beginning to despond. Quietly and slowly, but mercilessly, one hope after the other is being crushed and . . . . have I not a right to be a little despondent? I long unutterably after home, perhaps I am drifting away farther from it, perhaps nearer; but anyhow it is not cheering to see the realisation of one's plans again and again delayed, if not annihilated altogether, in this

tedious and monotonously killing way. Nature goes her age-old round impassively; summer changes into winter; spring vanishes away, autumn comes, and finds us still a mere chaotic whirl of daring projects and shattered hopes. As the wheel revolves, now the one and now the other comes to the top—but memory betweenwhiles lightly touches her ringing silver chords—now loud like a roaring waterfall, now low and soft like far off sweet music. I stand and look out over this desolate expanse of ice with its plains and heights and valleys, formed by the pressure arising from the shifting tidal currents of winter. The sun is now shining over them with his cheering beams. In the middle lies the *Fram*, hemmed in immovably. When, my proud ship, will you float free in the open water again?

"Ich schau dich an, und Wehmuth,
Schleicht mir in's Herz hinein."

Over these masses of ice, drifting by paths unknown, a human being pondered and brooded so long that he put a whole people in motion to enable him to force his way in among them—a people who had plenty of other claims upon their energies. For what purpose all this to do? If only the calculations were correct, these ice-floes would be glorious, nay irresistible auxiliaries. But if there has been an error in the calculation—well, in that case they are not so pleasant to deal with. And how

often does a calculation come out correct? But were I now free? Why, I should do it all over again, from the same starting-point. One must persevere till one learns to calculate correctly.

"I laugh at the scurvy; no sanatorium better than ours.

"I laugh at the ice; we are living as it were in an impregnable castle.

"I laugh at the cold; it is nothing.

"But I do not laugh at the winds; they are everything; they bend to no man's will.

"But why always worry about the future? Why distress yourself as to whether you are drifting forwards or backwards? Why not carelessly let the days glide by like a peacefully flowing river? every now and then there will come a rapid that will quicken the lazy flow. Ah! what a wondrous contrivance is life—one eternal hurrying forwards, ever forwards—to what end? And then comes death and cuts all short before the goal is reached.

"I went a long snow-shoe tour to-day. A little way to the north there were a good many newly-formed lanes and pressure-ridges which were hard to cross, but patience overcomes everything, and I soon reached a level plain where it was delightful going. It was, however, rather cold, about 54° F. below zero (−48° C.) and 16 feet of wind from N.N.E., but I did not feel it much. It is wholesome and enjoyable to be out in such weather. I wore only ordinary clothes such as I might wear at home with a

sealskin jacket and linen outside breeches, and a half-mask to protect the forehead, nose, and cheeks.

"There has been a good deal of ice-pressure in different directions to-day. Oddly enough, a meridian altitude of the sun gave 79° 45′. We have therefore drifted only 8′ southwards during the four days since March 4th. This slow drift is remarkable in spite of the high winds. If there should be land to the north? I begin more and more to speculate on this possibility. Land to the north would explain at once our not progressing northwards, and the slowness of our southward drift. But it may also possibly arise from the fact of the ice being so closely packed together, and frozen so thick and massive. It seems strange to me that there is so much north-west wind, and hardly any from the north-east, though the latter is what the rotation of the earth would lead one to expect. As a matter of fact, the wind merely shifts between north-west and south-east, instead of between south-west and north-east, as it ought to do. Unless there is land I am at a loss to find a satisfactory explanation, at all events, of this north-west direction. Does Franz Josef Land jut out eastwards or northwards, or does a continuous line of islands extend from Franz Josef Land in one or other of those directions? It is by no means impossible. Directly the Austrians got far enough to the north they met with prevailing winds from the north-east, while we get north-westerly winds. Does

the central point of these masses of land lie to the north, midway between our meridian and theirs? I can hardly believe that these remarkably cold winds from the north are engendered by merely passing over an ice-covered sea. If, indeed, there is land, and we get hold of it, then all our troubles would be over. But no one can tell what the future may bring forth, and it is better, perhaps, not to know.

"Saturday, March 10. The line shows a drift northwards; now, too, in the afternoon, a slight southerly breeze has sprung up. As usual it has done me good to put my despondency on paper and get rid of it. To-day I am in good spirits again, and can indulge in happy dreams of a large and high land in the north, with mountains and valleys, where we can sit under the mountain wall, roast ourselves in the sun, and see the spring come. And over its inland ice we can make our way to the very Pole.

"Sunday, March 11th. A snow-shoe run northwards. Temperature, — 50° C. (58° F. below zero), and 10 feet wind from N.N.E. We did not feel the cold very much, though it was rather bad for the stomach and thighs, as none of us had our wind trousers* on. We wore our usual dress of a pair of ordinary trousers and woollen pants, a shirt,

* So we called some light trousers of thin close cotton, which we used as a protection against the wind and snow.

and wolf's skin cloak, or a common woollen suit with a light sealskin jacket over it. For the first time in my life I felt my thighs frozen, especially just over the knee, and on the kneecap; my companions also suffered in the same way. This was after going a long while against the wind. We rubbed our legs a little, and they soon got warm again, but had we kept on much longer without noticing it, we should probably have been severely frost-bitten. In other respects we did not suffer the least inconvenience from the cold, on the contrary found the temperature agreeable; and I am convinced that 10°, 20°, or even 30°, lower would not have been unendurable. It is strange how one's sensations alter. When at home, I find it unpleasant if I only go out of doors when there are some 20 degrees of cold, even in calm weather. But here I don't find it any colder when I turn out in 50 degrees of cold with a wind into the bargain. Sitting in a warm room at home one gets exaggerated ideas about the terribleness of the cold. It is really not in the least terrible: we all of us find ourselves very well in it, though sometimes one or another of us does not take quite so long a walk as usual when a strong wind is blowing, and will even turn back for the cold; but that is when he is only lightly clad and has no wind clothes on. This evening it is 51·2° F. below zero, and 14½ feet N.N.E. wind. Brilliant northern lights in the south. Already there is a very marked twilight even at midnight.

"Monday, March 12th. Slowly drifting southwards. Took a long snow-shoe run alone, towards the north; to-day had on my wind-breeches, but found them almost too warm. This morning it was 51·6° F. below zero, and about 13 feet N. wind; at noon it was some degrees warmer. Ugh! this north wind is freshening; the barometer has risen again, and I had thought the wind would have changed, but it is and remains the same.

"This is what March brings us—the month on which my hopes relied. Now I must wait for the summer. Soon the half-year will be past, it will leave us about in the same place as when it began. Ugh! I am weary—so weary—let me sleep, sleep! Come sleep! noiselessly close the door of the soul, stay the flowing stream of thought! Come dreams, and let the sun beam over the snowless strand of Godthaab!

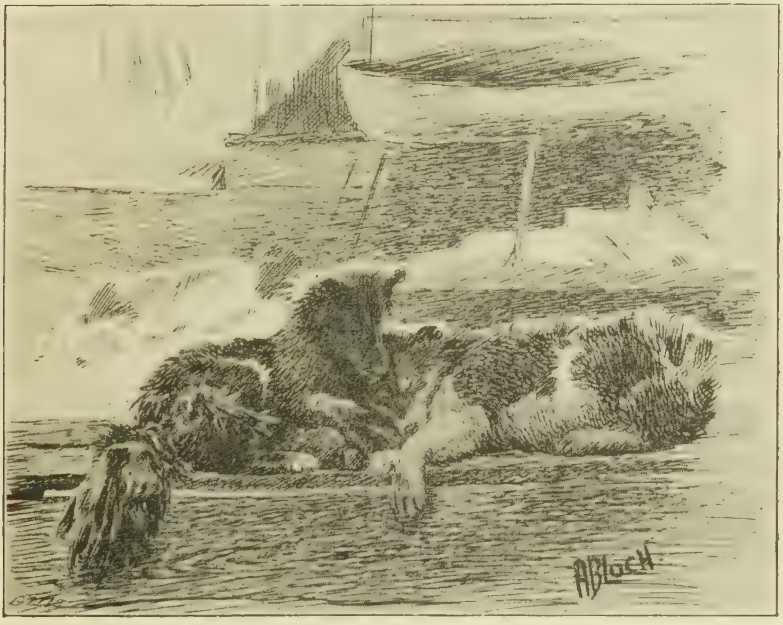
"Wednesday, March 14th. In the evening the dogs all at once began to bark, as we supposed on account of bears. Sverdrup and I took our guns, let 'Ulenka' and 'Pan' loose, and set off. There was twilight still, and the moon moreover began to shine. No sooner were the dogs on the ice than off they started westward like a couple of rockets, we after them as quickly as we could. As I was jumping over a lane I thrust one leg through the ice up to the knee. Oddly enough, I did not get wet through to the skin, though I only had Finn shoes and frieze gaiters on; but in this temperature, 38° F. below zero (−39° C.), the water freezes on the cold cloth before it can

penetrate it. I felt nothing of it afterwards ; it became, as it were, a plate of ice armour that almost helped to keep me warm. At a channel some distance off we at last discovered that it was not a bear the dogs had winded, but either a walrus or a seal. We saw holes in several places on the fresh-formed ice where it had stuck its head through. What a wonderfully keen nose those dogs must have : it was quite two-thirds of a mile from the ship, and the creature had only had just a little bit of its snout above the ice. We returned to the ship to get a harpoon, but saw no more of the animal, though we went several times up and down the channel. Meanwhile 'Pan,' in his zeal, got too near the edge of the lane and fell into the water. The ice was so high that he could not get up on it again without help, and if I had not been there to haul him up I am afraid he would have been drowned. He is now lying in the saloon, and making himself comfortable and drying himself ; but he, too, did not get wet through to the skin, though he was a good time in the water : the inner hair of his close, coarse coat is quite dry and warm. The dogs look on it as a high treat to come in here, for they are not often allowed to do so. They go round all the cabins and look out for a comfortable corner to lie down in.

"Lovely weather, almost calm, sparklingly bright, and moonshine : in the north the faint flush of evening, and the aurora over the southern sky, now like a row of

flaming spears, then changing into a silvery veil, undulating in wavy folds with the wind, every here and there interspersed with red sprays. These wonderful night effects are ever new, and never fail to captivate the soul.

"Thursday, March 15th. This morning 41·7° and



By A. Bloch] TWO FRIENDS. [*from a Photograph.*

at 8 o'clock p.m. 40·7° F. below zero, while the daytime was rather warmer. At noon it was 40·5° and at 4 p.m. 39° F. below zero. It would almost seem as if the sun began to have power.

"The dogs are strange creatures. This evening they

are probably sweltering in their kennels again, for four or five of them are lying outside or on the roof. When there is 50° of cold most of them huddle together inside, and lie as close to one another as possible. Then, too, they are very loth to go out for a walk, they prefer to lie in the sun under the lee of the ship. But now they find it so mild and such pleasant walking that to-day it was not difficult to get them to follow.

"Friday, March 16th. Sverdrup has of late been occupied in making sails for the ship's boats. To-day there was a light south-westerly breeze, so we tried one of the sails on two hand-sledges lashed together. It is first-rate sailing, and does not require much wind to make them glide along. This would be a great assistance if we had to go home over the ice.

"Wednesday, March 21st. At length a re-action has set in: the wind is S.E. and there is a strong drift northwards again. The equinox is past, and we are not one degree further north since the last equinox. I wonder where the next will find us. Should it be more to the south, then victory is uncertain; if more to the north the battle is won, though it may last long. I am looking forward to the summer; it must bring a change with it. The open water we sailed in up here cannot possibly be produced by the melting of the ice alone; it must be also due to the winds and current. And if the ice in which we are now, drifts so far to the north as to make room for all this open water, we shall have covered a good

bit on our way. It would seem, indeed, as if summer must bring northerly winds, with the cold Arctic Sea in the north and warm Siberia in the south. This makes

From a] EXPERIMENT IN SLEDGE SAILING. [*Photograph.*

me somewhat dubious—but, on the other hand, we have warm seas in the west; they may be stronger; and the *Jeannette* moreover drifted north-west.

"It is strange, that notwithstanding these westerly winds we do not drift eastwards. The last longitude was only 135° E. long.

"Maundy Thursday, March 22nd. A strong south-easterly wind still, and a good drift northwards. Our spirits are rising. The wind whistles through the rigging overhead, and sounds like the sough of victory through the air. In the forenoon one of the puppies had a severe attack of convulsions; it foamed at the mouth, and bit furiously at everything round it. It ended with tetanus and we carried it out and laid it down on the ice. It hopped about like a toad, its legs stiff and extended, neck and head pointing upwards, while its back was curved like a saddle. I was afraid it might be hydrophobia or some other infectious sickness and shot it on the spot. Perhaps I was rather too hasty, we can scarcely have any infection among us now. But what could it have been? Was it an epileptic attack? The other day one of the other puppies alarmed me by running round and round in the chart-house as if it were mad, hiding itself after a time between a chest and the wall. Some of the others, too, had seen it do the same thing; but after a while it got all right again, and for the last few days there has been nothing amiss with it.

"Good Friday, March 23rd. Noonday observation gives 80° N. lat. In four days and nights we have drifted as far north as we drifted southwards in three weeks. It is a comfort, at all events, to know that!

"It is remarkable how quickly the nights have grown light. Even stars of the first magnitude can now barely manage to twinkle in the pale sky at midnight.

"Saturday, March 24th. Easter Eve. To-day a notable event has occurred. We have allowed the light of spring to enter the saloon. During the whole of the winter the skylight was covered with snow to keep the cold out, and the dogs' kennels, moreover, had been placed round it. Now we have thrown out all the snow upon the ice, and the panes of glass in the skylight have been duly cleared and cleaned.

"Monday, March 26th. We are lying motionless—no drift. How long will this last? Last equinox how proud and triumphant I was; the whole world looked bright; but now I am proud no longer.

"The sun mounts up and bathes the ice-plain with its radiance. Spring is coming, but brings no joys with it. Here it is as lonely and cold as ever. One's soul freezes. Seven more years of such life—or say only four—how will the soul appear then? And she. . . .? If I dared to let my longings loose—to let my soul thaw. Ah! I long more than I dare confess.

"I have not courage to think of the future. . . . And how will it be at home, when year after year rolls by and no one comes?

"I know this is all a morbid mood; but still this inactive, lifeless monotony, without any change, wrings one's very soul. No struggle, no possibility of struggle!

All is so still and dead, so stiff and shrunken under the mantle of ice. Ah! . . . . the very soul freezes. What would I not give for a single day of struggle—for even a moment of danger!

"Still I must wait, and watch the drift; but, should it take a wrong direction, then I will break all the bridges behind me, and stake everything on a northward march over the ice. I know nothing better to do. It will be a hazardous journey, a matter, may be, of life or death. But have I any other choice?

"It is unworthy of a man to set himself a task and then give in when the brunt of the battle is upon him. There is but one way, and that is *Fram*—forwards.

"Tuesday, March 27th. We are again drifting southwards, and the wind is northerly. The midday observation showed 80° 4′ N. lat. But why so dispirited? I am staring myself blind at one single point—am thinking solely of reaching the Pole and forcing our way through to the Atlantic Ocean. And all the time our real task is to explore the unknown polar regions. Are we doing nothing in the service of science? It will be a goodly collection of observations that we shall take home with us from this region, with which we are now rather too well acquainted. The rest is, and remains, a mere matter of vanity. 'Love truth more, and victory less.'

"I look at Eilif Peterssen's picture, a Norwegian pine forest, and I am there in spirit. How marvellously

lovely it is there now, in the spring, in the dim, melancholy stillness that reigns among the stately stems. I can feel the damp moss in which my foot sinks softly and noiselessly; the brook released from the winter bondage is murmuring through the clefts and among the rocks, with its brownish-yellow water; the air is full of the scent of moss and pine needles, while overhead against the light blue sky, the dark pine tops rock to and fro in the spring breeze, ever uttering their murmuring wail, and beneath their shelter the soul fearlessly expands its wings and cools itself in the forest dew.

"Oh, solemn pine forest, the only confidant of my childhood, it was from you I learned nature's deepest tones, its wildness, its melancholy. You coloured my soul for life.

"Alone—far in the forest—beside the glowing embers of my fire on the shore of the silent, murky woodland tarn, with the gloom of night overhead, how happy I used to be in the enjoyment of Nature's harmony.

"Thursday, March 29th. It is wonderful what a change it makes to have daylight once more in the saloon. On turning out for breakfast and seeing the light gleaming in, one feels that it really is morning.

"We are busy on board. Sails are being made for the boats and hand-sledges. The windmill, too, is to have fresh sails, so that it can go in any kind of weather. Ah! if we could but give the *Fram* wings as well. Knives are being forged, bear spears which we never

have any use for, bear-traps in which we never catch a bear, axes and many other things of like usefulness. For the moment there is a great manufacture of wooden shoes going on, and a newly started nail-making industry. The only shareholders in this company are Sverdrup and Smith Lars, called 'Storm King,' because he always comes upon us like hard weather. The output is excellent and is in active demand, as all our small nails for the hand-sledge fittings have been used. Moreover, we are very busy putting German-silver plates under the runners of the hand sledges, and providing appliances for lashing sledges together. There is, moreover, a workshop for snow-shoe fastenings, and a tinsmith's shop busied for the moment with repairs to the lamps. Our doctor too for lack of patients has set up a bookbinding establishment which is greatly patronised by the *Fram's* library, whereof several books that are in constant circulation, such as *Gjest Baardsens Liv og Levnet*, etc., etc., are in a very bad state. We have also a saddlers' and sailmakers' workshop, a photographic studio, etc., etc. The manufacture of diaries, however, is the most extensive—every man on board works at that. In fine, there is no thing between heaven and earth that we cannot turn out—excepting constant fair winds.

"Our workshops can be highly recommended; they turn out good solid work. We have lately had a notable addition to our industries, the firm 'Nansen

RETURNING HOME AFTER SUNSET. 31 MARCH, 1894.

(From a photograph.)

and Amundsen' having established a music factory. The cardboard plates of the organ had suffered greatly from wear and damp, so that we had been deplorably short of music during the winter. But, yesterday, I set to work in earnest to manufacture a plate of zinc. It answers admirably, and now we shall go ahead with music sacred and profane, especially valses, and these halls shall once more resound with the pealing tones of the organ, to our great comfort and edification. When a valse is struck up it breathes fresh life into many of the inmates of the *Fram*.

"I complain of the wearing monotony of our surroundings; but in reality I am unjust. The last few days dazzling sunshine over the snowhills; to-day, snowstorm and wind, the *Fram* enveloped in a whirl of foaming white snow. Soon the sun appears again, and the waste around gleams as before.

"Here, too, there is sentiment in Nature. How often when least thinking of it, do I find myself pause, spell-bound by the marvellous hues which evening wears. The ice-hills steeped in bluish-violet shadows, against the orange-tinted sky, illumined by the glow of the setting sun, form as it were a strange colour-poem, imprinting an ineffaceable picture on the soul. And these bright dream-like nights, how many associations they have for us Northmen! One pictures to oneself those mornings in spring when one went out into the forest after blackcock, under the dim stars, and with the pale

crescent moon peering over the treetops. Dawn, with its glowing hues up here in the north, is the breaking of a spring day over the forest wilds at home; the hazy blue vapour beneath the morning glow, turns to the fresh early mist over the marshes; the dark low clouds on a background of dim red, seem like distant ranges of hills.

"Daylight here with its rigid, lifeless whiteness has no attractions; but the evening and night thaw the heart of this world of ice; it dreams mournful dreams, and you seem to hear in the hues of the evening, sounds of its smothered wail. Soon these will cease, and the sun will circle round the everlasting light blue expanse of heaven, imparting one uniform colour to day and night alike.

"Friday, April 6th. A remarkable event was to take place to-day, which naturally we all looked forward to with lively interest. It was an eclipse of the sun. During the night Hansen had made a calculation that the eclipse would begin at 12.56 o'clock. It was important for us to be able to get a good observation, as we should thus be able to regulate our chronometers to a nicety. In order to make everything sure, we set up our instruments a couple of hours beforehand, and commenced to observe. We used the large telescope, and our large theodolite. Hansen, Johansen, and myself took it by turns to sit for five minutes each at the instruments, watching the rim of the sun, as we expected a shadow would become visible on its lower western edge, while another stood by with

Johansen. Nansen. Scott-Hansen.

OBSERVING THE ECLIPSE OF THE SUN. 6 APRIL, 1894.

(From a photograph.)

the watch. We remained thus full two hours without anything occurring. The exciting moment was now at hand, when, according to calculation, the shadow should first be apparent. Hansen was sitting by the large telescope, when he thought he could discern a quivering in the sun's rim; 33 seconds afterwards he cried out, 'Now!' as did Johansen simultaneously. The watch was then at 12 hrs. 56 m. 7·5 s. A dark body advanced over the border of the sun $7\frac{1}{2}$ seconds later than we had calculated on. It was an immense satisfaction for us all, especially for Hansen, for it proved our chronometers to be in excellent order. Little by little the sunlight sensibly faded away, while we went below to dinner. At 2 o'clock the eclipse was at its height, and we could notice even down in the saloon how the daylight had diminished. After dinner we observed the moment when the eclipse ended, and the moon's dark disc cleared the rim of the sun.

"Sunday, April 8th. I was lying awake yesterday morning thinking about getting up, when all at once I heard the hurried footsteps of some one running over the half-deck above me, and then another followed. There was something in those footsteps that involuntarily made me think of bears, and I had a hazy sort of an idea that I ought to jump up out of bed, but I lay still listening for the report of a gun. I heard nothing, however, and soon fell a-dreaming again. Presently Johansen came tearing down into the saloon, crying out

that a couple of bears were lying half or quite dead on the large ice hummock astern of the ship. He and Mogstad had shot at them, but they had no more cartridges left. Several of the men seized hold of their guns and hurried up. I threw on my clothes and came up a little after, when I gathered that the bears had taken to flight, as I could see the other fellows following them over the ice. As I was putting on my snow-shoes they returned, and said that the bears had made off. However, I started after them as fast as my snow-shoes would take me across the floes and the pressure-ridges. I soon got on their tracks, which at first were a little bloodstained. It was a she-bear, with her cub, and, as I believed, hard hit—the she-bear had fallen down several times after Johansen's first bullet. I thought, therefore, it would be no difficult matter to overtake them. Several of the dogs were on ahead of me on their tracks. They had taken a north-westerly course, and I toiled on, perspiring profusely in the sun, while the ship sank deeper and deeper down below the horizon. The surface of the snow, sparkling with its eternal whiteness all around me, tried my eyes severely, and I seemed to get no nearer the bears. My prospects of coming up with them were ruined by the dogs, who were keen enough to frighten the bears, but not so keen as to press on and bring them to bay. I would not, however, give up. Presently a fog came on, and hid everything from view except the bear-tracks, which steadily pointed forward; then it lifted,

and the sun shone out again clear and bright as before. The *Fram's* masts had long since disappeared over the edge of the ice, but still I kept on. Presently, however, I began to feel faint and hungry, for in my hurry I had not even had my breakfast, and at last had to bite the sour apple and turn back without any bears.

"On my way I came across a remarkable hummock. It was over 20 feet in height (I could not manage to measure it quite to the top); the middle part had fallen in, probably from pressure of the ice, while the remaining part formed a magnificent triumphal arch of the whitest marble, on which the sun glittered with all its brilliancy. Was it erected to celebrate my defeat? I got up on it to look out for the *Fram*, but had to go some distance yet before I could see her rigging over the horizon. It was not till half-past five in the afternoon that I found myself on board again, worn out and famished from this sudden and unexpected excursion. After a day's fasting, I heartily relished a good meal. During my absence some of the others had started after me with a sledge to draw home the dead bears that I had shot; but they had barely reached the spot where the encounter had taken place, when Johansen and Blessing, who were in advance of the others, saw two fresh bears spring up from behind a hummock a little way off. But before they could get their guns in readiness the bears were out of range; so a new hunt began. Johansen tore after them in his snow-shoes, but several of the dogs got in front of him and

kept the bears going, so that he could not get within range, and his chase ended as fruitlessly as mine.

"Has good luck abandoned us? I had plumed myself on our never having shot at a single bear without bagging it, but to-day . . . . ! Odd that we should get a visit from four bears on one day, after having seen nothing of them for three months! Does it signify something? Have we got near the land in the north-west which I have so long expected? There seems to be change in the air. An observation the day before yesterday gave 80° 15′ N. lat., the most northerly we have had yet.

"Sunday, April 15th. So we are in the middle of April! What a ring of joy in that word, a wellspring of happiness! Visions of spring rise up in the soul at its very mention—a time when doors and windows are thrown wide open to the spring air and sun, and the dust of winter is blown away; a time when one can no longer sit still, but must perforce go out of doors to inhale the perfume of wood and field and fresh-dug earth, and behold the fjord, free from ice, sparkling in the sunlight. What an inexhaustible fund of the awakening joys of nature does that word April contain! But here—here that is not to be found. True, the sun shines long and bright, but its beams fall not on forest or mountain or meadow, but only on the dazzling whiteness of the fresh-fallen snow. Scarcely does it entice one out from one's winter retreat. This is not the time of

revolutions here. If they come at all, they will come much later. The days roll on uniformly and monotonously ; here I sit, and feel no touch of the restless longings of the spring, and shut myself up in the snail-shell of my studies. Day after day I dive down into the world of the microscope, forgetful of time and surroundings. Now and then, indeed, I may make a little excursion from darkness to light—the daylight beams around me, and my soul opens a tiny loophole for light and courage to enter in—and then down, down into the darkness, and to work once more. Before turning in for the night I must go on deck. A little while ago the daylight would by this time have vanished, a few solitary stars would have been faintly twinkling, while the pale moon shone over the ice. But now even this has come to an end. The sun no longer sinks beneath the icy horizon ; it is continual day. I gaze into the far distance, far over the barren plain of snow, a boundless, silent, and lifeless mass of ice in imperceptible motion. No sound can be heard save the faint murmur of the air through the rigging, or perhaps far away the low rumble of packing ice. In the midst of this empty waste of white there is but one little dark spot, and that is the *Fram*.

" But beneath this crust, hundreds of fathoms down, there teems a world of chequered life in all its changing forms, a world of the same composition as ours, with the same instincts, the same sorrows, and also, no doubt, the

same joys; everywhere the same struggle for existence. So it ever is. If we penetrate within even the hardest shell, we come upon the pulsations of life, however thick the crust may be.

"I seem to be sitting here in solitude listening to the music of one of nature's mighty harp-strings. Her grand symphonies peal forth through the endless ages of the universe, now in the tumultuous whirl of busy life, now in the stiffening coldness of death, as in Chopin's Funeral March; and we—we are the minute, invisible vibrations of the strings in this mighty music of the universe, ever changing, yet ever the same. Its notes are worlds; one vibrates for a longer, another for a shorter period, and all in turn give way to new ones. . . . .

"The world that shall be! . . . . Again and again this thought comes back to my mind. I gaze far on through the ages. . . . .

"Slowly and imperceptibly the heat of the sun declines, and the temperature of the earth sinks by equally slow degrees. Thousands, hundreds of thousands, millions of years pass away, glacial epochs come and go; but the heat still grows ever less; little by little these drifting masses of ice extend far and wide, ever towards more southern shores, and no one notices it, but at last all the seas of earth become one unbroken mass of ice. Life has vanished from its surface, and is to be found in the ocean depths alone.

"But the temperature continues to fall, the ice grows thicker and ever thicker; life's domain vanishes. Millions of years roll on, and the ice reaches the bottom. The last trace of life has disappeared; the earth is covered with snow. All that we lived for is no longer; the fruit of all our toil and sufferings has been blotted out millions and millions of years ago, buried beneath a pall of snow. A stiffened, lifeless mass of ice this earth rolls on in her path through eternity. Like a faintly glowing disc, the sun crosses the sky; the moon shines no more, and is scarcely visible. Yet still, perhaps, the northern lights flicker over the desert, icy plain, and still the stars twinkle in silence, peacefully as of yore. Some have burnt out, but new ones usurp their place; and round them revolve new spheres, teeming with new life, new sufferings without any aim. Such is the infinite cycle of eternity; such are nature's everlasting rhythms.

"Monday, April 30th. Drifting northwards. Yesterday observations gave 80° 42′, and to-day 80° 44½′. The wind steady from the south and south-east.

"It is lovely spring weather. One feels that springtime must have come, though the thermometer denies it. 'Spring cleaning' has begun on board; the snow and ice along the *Fram's* sides are cleared away, and she stands out like the crags from their winter covering decked with the flowers of spring. The snow lying on the deck is little by little shovelled overboard; her rigging rises up against the clear sky clean and dark,

and the gilt trucks at her mastheads sparkle in the sun. We go and bathe ourselves in the broiling sun along her warm sides, where the thermometer is actually above freezing point, smoke a peaceful pipe, gazing at the white spring clouds that lightly fleet across the blue expanse. Some of us perhaps think of spring-time yonder at home, when the birch trees are bursting into leaf."

A SUMMER EVENING. 14 JULY, 1894.

(From a photograph.)

CHAPTER VII.

The Spring and Summer of 1894.

So came the season which we at home call spring, the season of joy and budding life, when nature awakens after her long winter sleep. But there it brought no change; day after day we had to gaze over the same white lifeless mass, the same white boundless ice-plains. Still we wavered between despondency, idle longing, and eager energy, shifting with the winds as we drift forwards to our goal or are driven back from it. As before, I continued to brood upon the possibilities of the future and of our drift. One day I would think that everything was going on as we hoped and anticipated. Thus on April 17th I was convinced that there must be a current through the unknown polar basin, as we were unmistakably drifting northwards. The midday observation gave 80° 20′ N.E., that is 9′ since the day before yesterday. Strange! A north wind of four whole days took us to the south, while twenty-four hours of this scanty wind drifts us 9′ northwards. This is remarkable; it looks as if we were done with drifting southwards. And when, in addition to this, I take into consideration the striking warmth of the water deep down, it seems

to me that things are really looking brighter. The reasoning runs as follows:—The temperature of the water in the East Greenland current, even on the surface, is nowhere over zero (the mean temperature for the year), and appears generally to be — 1° C. (30·2° F.), even in 70° N. lat. In this latitude the temperature steadily falls as you get below the surface: nowhere at a greater depth than 100 fathoms is it above — 1° C., and generally from — 1·5° (29·30° F.) to — 1·7° C. (28·94° F.) right to the bottom. Moreover, the bottom temperature of the whole sea north of the 60th degree of latitude is under — 1° C., a strip along the Norwegian coast and between Norway and Spitzbergen alone excepted, but here the temperature is over — 1° C., from 86 fathoms (160 metres) downward, and 135 fathoms (250 metres) the temperature is already + 0·55° C. (32·99° F.), and that, too, be it remarked, north of the 80th degree of latitude, and in a sea surrounding the pole of maximum cold.

This warm water can hardly come from the Arctic Sea itself, while the current issuing thence towards the south has a general temperature of about —1·5° C. It can hardly be anything other than the Gulf Stream that finds its way hither, and replaces the water which in its upper layers flows towards the north, forming the sources of the East Greenland polar current. All this seems to chime in with my previous assumptions, and supports the theory on which this expedition was planned. And

when, in addition to this, one bears in mind that the winds seem, as anticipated, to be as a rule south-easterly, as was, moreover, the case at the international station at Sagastyr (by the Lena mouth), our prospects do not appear to be unfavourable.

Frequently, moreover, I thought I could detect unmistakable symptoms of a steadily flowing north-westerly current under the ice, and then, of course, my spirits rose; but at other times, when the drift again bore southwards—and that was often—my doubts would return, and it seemed as if there was no prospect of getting through within any reasonable time. Truly such drifting in the ice is extremely trying to the mind; but there is one virtue it fosters, and that is patience; the whole expedition was in reality one long course of training in this useful virtue.

Our progress as the spring advanced grew somewhat better than it had been during the winter, but on the whole it was always the same sort of crablike locomotion; for each time we made a long stretch to the north, a longer period of reaction was sure to follow. It was, in the opinion of one of our number, who was somewhat of a politician, a constant struggle between the Left and Right, between Progressionists and Recessionists. After a period of Left wind and a glorious drift northwards, as a matter of course the "Radical Right" took the helm, and we remained lying in dead water or drifted backwards, thereby putting Amundsen into a very bad

temper. It was a remarkable fact that during the whole time, the *Fram's* bow turned towards the south, generally S. $\frac{1}{4}$ W., and shifted but very little during the whole drift. As I say on May 14th: "She went backwards towards her goal in the north, with her nose ever turned to the south. It is as though she shrank from increasing her distance from the world; as though she were longing for southern shores, while some invisible power is drawing her on towards the unknown. Can it be an ill omen, this backward advance towards the interior of the Polar Sea? I cannot think it; even the crab ultimately reaches its goal."

A statement of our latitude and longitude on different days will best indicate the general course of our drift:—

May 1st, 80° 46′ N. lat.; May 4th, 80° 50′; May 6th, 80° 49′; May 8th, 80° 55′ N. lat., 129° 58′ E. long.; May 12th, 80° 52′ N. lat.; May 15th, 129° 20′ E. long.; May 21st, 81° 20′ N. lat., 125° 45′ E. long.; May 23rd, 81° 26′ N. lat.; May 27th, 81° 31′; June 2nd, 81° 31′ N. lat., 121° 47′ E. long.; June 13th, 81° 46′; June 18th, 81° 52′. Up to this we had made fairly satisfactory progress towards the north, but now came the reaction: June 24th, 81° 42′; July 1st, 81° 33′; July 10th, 81° 20′; July 14th, 81° 32′; July 18th, 81° 26′; July 31st, 81° 2′ N. lat., 126° 5′ 5″ E. long.; August 8th, 81° 8′; August 14th, 81° 5′ N. lat., 127° 38′ E. long.; August 26th, 81° 1′; September 5th, 81° 14′ N. lat., 123° 36′ E. long.

TAKING A SOUNDING OF 2058 FATHOMS.

(From a photograph.)

After this we began once more to drift northwards, but not very fast.

As before, we were constantly on the look-out for land, and were inclined first from one thing, then from another, to think we saw signs of its proximity; but they always turned out to be imaginary, and the great depth of the sea, moreover, showed that at all events land could not be near.

Later on—on August 7th—when I had found over 2,085 fathoms (3,850 metres) depth, I say in my diary: "I do not think we shall talk any more about the shallow Polar Sea, where land may be expected anywhere. We may very possibly drift out into the Atlantic Ocean without having seen a single mountain-top. An eventful series of years to look forward to!"

The plan already alluded to of travelling over the ice with dogs and sledges occupied me a good deal, and during my daily expeditions partly on snow-shoes, partly with dogs, my attention was constantly given to the condition of the ice and our prospects of being able to make our way over it. During April it was specially well adapted for using dogs. The surface was good, as the sun's power had made it smoother than the heavy drift-snow earlier in the winter; besides, the wind had covered the pressure-ridges pretty evenly, and there were not many crevasses or channels in the ice, so that one could proceed for miles without much trouble from them. In May, however, a change set in. So early as

May 8th the wind had broken up the ice a good deal, and now there were lanes in all directions, which proved a great obstacle when I went out driving with the dogs. The temperature, however, was still so low that the channels were quickly frozen over again and became passable; but later on in the month the temperature rose, so that ice was no longer so readily formed on the water, and the channels became ever more and more numerous.

On May 20th I write: "Went out on snow-shoes in the forenoon. The ice has been very much broken up in various directions, owing to the continual winds during the last week. The lanes are difficult to cross over, as they are full of small pieces of ice, that lie dispersed about, and are partly covered with drift-snow. This is very deceptive, for one may seem to have firm ice under one at places where, on sticking one's staff in, it goes right down without any sign of ice." On many occasions I nearly got into trouble in crossing over snow like this on snow-shoes. I would suddenly find that the snow was giving way under me, and would manage with no little difficulty to get safely back on to the firm ice.

On June 5th the ice and the snow surface were about as before. I write: "Have just been out on a snow-shoe excursion with Sverdrup in a southerly direction, the first for a long while. The condition of the ice has altered, but not for the better; the sur-

face, indeed, is hard and good, but the pressure-ridges are very awkward, and there are crevasses and hummocks in all directions. A sledge expedition would make poor enough progress on such ice as this."

Hitherto, however, progress had always been possible, but now the snow began to melt, and placed almost insuperable difficulties in the way. On June 13th I write: "The ice gets softer and softer every day, and large pools of water are formed on the floes all around us. In short, the surface is abominable. The snow-shoes break through into the water everywhere. Truly one would not be able to get far in a day now should one be obliged to set off towards the south or west. It is as if every outlet were blocked, and here we stick—we stick. Sometimes it strikes me as rather remarkable that none of our fellows have become alarmed, even when we are bearing farther and farther northwards, farther and farther into the unknown; but there is no sign of fear in any one of them. All look gloomy when we are bearing south or too much to the west, and all are beaming with joy when we are drifting to the northward, the farther the better. Yet none of them can be blind to the fact that it is a matter of life and death, if anything of what nearly every one prophesied should now occur. Should the ship be crushed in this ice and go to the bottom, like the *Jeannette*, without our being able to save sufficient supplies to continue our drift on the ice, we should have to turn our course to the south,

and then there would be little doubt as to our fate. The *Jeannette* people fared badly enough, but their ship went down in 77° N. lat., while the nearest land to us is many times more than double the distance it was in their case, to say nothing of the nearest inhabited land. We are now more than 70 miles from Cape Chelyuskin, while from there to any inhabited region we are a long way farther. But the *Fram* will not be crushed, and nobody believes in the possibility of such an event. We are like the kayak-rower, who knows well enough that one faulty stroke of his paddle is enough to capsize him and send him into eternity; but none the less he goes on his way serenely, for he knows that he will not make a faulty stroke. This is absolutely the most comfortable way of undertaking a polar expedition; what possible journey, indeed, could be more comfortable? Not even a railway journey, for then you have the bother of changing carriages. Still a change now and then would be no bad thing."

Later on—in July—the surface was even worse. The floes were everywhere covered with slush, with water underneath, and on the pressure-ridges and between the hummocks where the snow-drifts were deep one would often sink in up to the middle, not even the snow-shoes bearing one up in this soft snow. Later on in July matters improved, the snow having gradually melted away, so that there was a firmer surface of ice to go on.

READING THE TEMPERATURE WITH A LENS. 12 JULY, 1894.

(From a photograph.)

But large pools of water now formed on the ice-floes. Already on the 8th and 9th of June such a pool had begun to appear round the ship, so that she lay in a little lake of fresh water, and we were obliged to make use

SAILING ON THE FRESH-WATER POOL (JULY 12TH, 1894).

(From a Photograph.)

of a bridge in order to reach a dry spot on the ice. Some of these fresh-water pools were of respectable dimensions and depth. There was one of these on the starboard side of the ship, so large that in the middle of July we could row and sail on it with the boats.

This was a favourite evening amusement with some of us, and the boat was fully officered with captain, mate, and second mate, but had no common sailors. They thought it an excellent opportunity of practising sailing with a square sail; while the rest of our fellows standing on the icy shore, found it still more diverting to bombard the navigators with snowballs and lumps of ice. It was in this same pool that we tried one day if one of our boats could carry all thirteen of us at once. When the dogs saw us all leave the ship to go to the pool they followed us in utter bewilderment as to what this unusual movement could mean; but when we got into the boat they, all of them, set to work and howled in wild despair; thinking, probably, that they would never see us again. Some of them swam after us, while two cunning ones, "Pan" and "Kvik," conceived the brilliant idea of galloping round the pool to the opposite side to meet us. A few days afterwards I was dismayed to find the pool dried up; a hole had been worn through the ice at the bottom, and all the fresh water had drained out into the sea. So that amusement came to an end.

In the summer when we wanted to make an excursion over the ice, in addition to such pools we met with lanes in the ice in all directions, but as a rule could easily cross them by jumping from one loose floe to another, or leaping right across at narrow places.

These lanes never attained any great width, and there was consequently no question of getting the *Fram* afloat in any of them; and even could we have done so, it would have been of very little avail, as none of them was large enough to have taken her more than a few cable-lengths further north. Sometimes there were indications in the sky that there must be large stretches of open water in our vicinity, and we could now and then see from the crow's-nest large spaces of clear water in the horizon; but they could not have been large enough to be of much use when it came to a question of pushing forward with a ship.

Sanguine folk on board, however, attached more importance to such open stretches. June 15th I wrote in my diary:—"There are several lanes visible in different directions, but none of them is wide or of any great extent. The mate, however, is always insisting that we shall certainly get open water before autumn, and be able to creep along northwards, while, with the rest, Sverdrup excepted, it seems to be a generally accepted belief. Where they are to get their open water from I do not know. For the rest, this is the first ice-bound expedition that has not spent the summer spying after open water, and sighing and longing for the ice to disperse. I only wish it may keep together, and hurry up and drift northwards. Everything in this life depends on what one has made up one's mind to. One person sets forth to sail in open

water, perhaps to the very Pole, but gets stuck in the ice and laments; another is prepared to get stuck in the ice, but will not grumble even should he find open water. It is ever the safest plan to expect the least of life, for then one often gets the most."

The open spaces, the lanes, and the rifts in the ice are, of course, produced, like the pressure and packing, by the shifting winds and the tidal currents that set the ice drifting first in one direction, then in another. And they best prove, perhaps, how the surface of the Polar Sea must be considered as one continuous mass of ice-floes in constant motion, now frozen together, now torn apart, or crushed against each other.

During the whole of our drift I paid great attention to this ice, not only with respect to its motion, but to its formation and growth as well. In the Introduction of this book I have pointed out that, even should the ice pass year after year in the cold Polar Sea, it could not by mere freezing attain more than a certain thickness. From measurements that were constantly being made, it appeared that the ice which was formed during the autumn in October or November continued to increase in size during the whole of the winter and out into the spring, but more slowly the thicker it became. On April 10th it was about 2·31 metres; April 21st, 2·41 metres; May 5th, 2·45 metres; May 31, 2·52 metres; June 9th, 2·58 metres. It was thus continually increasing in bulk, notwithstanding [that the snow now melted

quickly on the surface, and large pools of fresh water were formed on the floes. On June 20th the thickness was the same, although the melting on the surface had now increased considerably. On July 4th the thickness was 2·57 metres. On July 10th I was amazed to find that the ice had increased to 2·76 metres, notwithstanding that it would now diminish several centimetres daily from surface melting. I bored in many places, but found it everywhere the same—a thin, somewhat loose, ice mass lay under the old floe. I first thought it was a thin ice-floe that had got pushed under, but subsequently discovered that it was actually a new formation of fresh-water ice on the lower side of the old ice, due to the layer of fresh water of about 9 feet 9 inches (3 metres) in depth, formed by the melting of the snow on the ice. Owing to its lightness this warm fresh water floated on the salt sea water, which was at a temperature of about (−1·5° C.) on its surface. Thus by contact with the colder sea water the fresh water became cooler, and so a thick crust of ice was formed on the fresh water, where it came in contact with the salt water lying underneath it. It was this ice crust then that augmented the thickness of the ice on its under side. Later on in the summer, however, the ice diminished somewhat, owing to melting on the surface. On July 23rd, the old ice was only 2·33 metres, and with the newly-formed layer 2·49 metres. On August 10th the thickness of the old ice had decreased to 1·94 metres, and together the aggre-

gate thickness to 3·17 metres. On August 22nd the old ice was 1·86 metres, and the aggregate thickness 3·06 metres. On September 3rd the aggregate thickness was 2·02 metres, and on September 30th 1·98 metres. On October 3rd it was the same; the thickness of the old ice was then 1·75 metres. On October 12th the aggregate thickness was 2·08 metres, while the old ice was 1·8 metres. On November 10th it was still about the same, with only a slight tendency to increase. Further on in November and in December it increased quite slowly. On December 11th the aggregate thickness reached 2·11 metres. On January 3rd, 1895, 2·32 metres; January 10th, 2·48 metres; February 6th, 2·59 metres. Hence it will be seen that the ice does not attain any enormous thickness by direct freezing. The packing caused by pressure can, however, produce blocks and floes of a very different size. It often happens that the floes get shoved in under each other in several layers, and are frozen together so as to appear like one originally continuous mass of ice. Thus the *Fram* had got a good bed under her.

Juell and Peter had often disputed together during the winter as to the thickness of ice the *Fram* had under her. Peter, who had seen a good deal of the ice before, maintained that it must at least be 20 feet thick, while Juell would not believe it, and betted 20 kroner that it was not as thick as that. On April 19th this dispute again broke out, and I say of it in my diary: "Juell has undertaken to make a bore, but unfortunately our borer

THE DRIFT-ICE IN SUMMER. 12 JULY, 1894.

(From a photograph.)

reaches no farther than 16 feet down. Peter, however, has undertaken to cut away the 4 feet that are lacking. There has been a lot of talk about this wager during the whole winter, but they could never agree about it. Peter says that Juell should begin to bore, while Juell maintains that Peter ought to cut the 4 feet first. This evening it ended in Juell incautiously offering 10 kroner to anyone who would bore. Bentzen took him at his word, and immediately set to work at it with Amundsen; he thought one did not always have the chance of earning 10 kroner so easily. Amundsen offered him a kroner an hour, or else payment per foot; and time payment was finally agreed to. They worked till late on into the night, and when they had got down 12 feet, the borer slipped a little way, and water rose in the hole, but this did not come to much, and presently the borer struck on ice again. They went on for some time, but now the borer would reach no further, and Peter had to be called up to cut his four feet. He and Amundsen worked away at cutting till they were dripping with perspiration. Amundsen, as usual, was very eager and vowed he would not give in till he had got through it, even if it were 30 feet thick. Meanwhile Bentzen had turned in, but a message was sent to him to say that the hole was cut, and that boring could now begin again. When it was only an inch or an inch-and-a-half short of 20 feet, the borer slipped through, and the water spurted up and filled the hole. They now sank a

lead line down it, and at 30 feet it again brought up against ice. Now they were obliged to give it up. A fine lump of ice we are lying on! Not taking into account a large, loose ice-floe that is lying packed up on the ice, it is 16 inches above the water; and adding to this the 2 feet which the *Fram* is raised up above the ice, there is no small distance between her and the water.

The temperature on the ice in summer is about thawing point, but gradually as the winter cold comes on, it, of course, falls rapidly on the surface, whence the cold slowly penetrates deeper and deeper down towards the lower surface, where it naturally keeps at an even temperature with the underlying water. Observations of the temperature of the ice in its different layers were constantly taken in order to ascertain how quickly this cooling-down process of the ice took place during the winter, and also how the temperature rose again towards spring. The lowest temperature of the ice occurred in March and the beginning of April, when at 1·2 metres it was about 3·2° F. (−16° C.). and at 0·8 metre about 22° F. below zero (−30° C.). After the beginning of April it began to rise slowly.

At these low temperatures the ice became very hard and brittle, and was readily cracked or broken up by a blow or by packing. In the summer, on the other hand, when its temperature was near melting-point, the ice became tough and plastic, and was not so readily broken up under packing. This difference between the condition

of the ice in summer and winter was apparent also to the ear, as the ice-packing in winter was always accompanied by the frequently mentioned loud noises, while the packing of the tough summer ice was almost noiseless, so that the most violent convulsions might take place close to us without our noticing them.

In the immediate vicinity of the *Fram* the ice remained perfectly at rest the whole year through, and she was not at this time exposed to any great amount of pressure; she lay safe and secure on the ice-floe to which she was firmly frozen; and gradually as the surface of the ice thawed under the summer sun she rose up higher and higher. In the autumn she again began to sink a little, either because the ice gave way under her weight, or because it melted somewhat on the under surface, so that it no longer had so much buoyancy as before.

Meanwhile, life on board went on in its usual way. Now that we had daylight there was of course more work of various descriptions on the ice than had been the case during the winter. I have already alluded more than once to our unsuccessful endeavours to reach the bottom by sounding. Unfortunately we were not prepared for such great depths, and had not brought any deep-sea sounding apparatus with us. We had, therefore, to do the best we could under the circumstances; and that was to sacrifice one of the ship's steel cables in order to make a lead-line. It was not difficult to find sufficient space on the ice for a rope walk, and although

a temperature of from 22° F. below zero (— 30° C.) to 40° F. below zero (— 40° C.) is not the pleasantest in which to manipulate such things as steel-wire, yet for all that the work went on well. The cable was unlaid into its separate strands, and a fresh, pliant lead-line manufactured by twisting two of these strands together. In this way we made a line of between 4,000 to 5,000 metres (2,150 to 2,700 fathoms) long, and could now at last reach the bottom. The depth proved to range between 3,300 and 3,900 metres (1,800 to 2,100 fathoms).

This was a remarkable discovery, for, as I have frequently mentioned, the unknown polar basin has always been supposed to be shallow, with numerous unknown lands and islands. I, too, had assumed it to be shallow when I sketched out my plan (*see* page 24), and had thought it was traversed by a deep channel which might possibly be a continuation of the deep channel in the North Atlantic (*see* page 28).

From this assumption of a shallow Polar Sea it was concluded that the regions about the Pole had formerly been covered with an extensive tract of land, of which the existing islands are simply the remains. This extensive tract of polar land was furthermore assumed to have been the nursery of many of our animal and plant forms, whence they had found their way to lower latitudes. These conjectures now appear to rest on a somewhat infirm basis.

This great depth indicates that here, at all events,

there has not been land in any very recent geological period ; and this depth is, no doubt, as old as the depth of the Atlantic Ocean, of which it is almost certainly a part.

Another task to which I attached great importance

SCOTT-HANSEN. JOHANSEN.

TAKING WATER TEMPERATURES.

and to which I have frequently alluded, was the observation of the temperature of the sea at different depths, from the surface down to the bottom. These observations we took as often as time permitted, and, as already mentioned, they gave some surprising results, showing

the existence of warmer water below the cold surface stratum. This is not the place to give the results of the different measurements, but as they are all very similar I will instance one of them in order that an idea may be formed how the temperature is distributed.

This series of temperatures, of which an extract is given here, was taken from the 13th to the 17th of August.

Table of Temperatures.

Depths.		Temperature.	
	Fathoms.	Degrees Centigrade.	Fahrenheit.
Surface	...	+ 1·02	= 33·83
2 metres	= 1	— 1·32	29·62
20 ,,	10	— 1·33	29·61
40 ,,	21	— 1·50	29·3
60 ,,	32	— 1·50	29·3
80 ,,	43	— 1·50	29·3
100 ,,	54	— 1·40	29·48
120 ,,	65	— 1·24	29·77
140 ,,	76	— 0·97	30·254
160 ,,	87	— 0·58	30·96
180 ,,	98	— 0·31	31·44
200 ,,	109	— 0·03	31·95
220 ,,	120	+ 0·19	32·34
240 ,,	131	+ 0·20	32·36
260 ,,	142	+ 0·34	32·61
280 ,,	153	+ 0·42	32·76
300 ,,	164	+ 0·34	32·61
350 ,,	191	+ 0·44	32·79
400 ,,	218	+ 0·35	32·63
450 ,,	246	+ 0·36	32·66
500 ,,	273	+ 0·34	32·61
600 ,,	328	+ 0·26	32·47
700 ,,	382	+ 0·14	32·25
800 ,,	437	+ 0·07	32·126

TABLE OF TEMPERATURES—*continued.*

Depths.		Temperature.	
	Fathoms.	Degrees. Centigrade.	Fahrenheit.
900 metres	492	— 0·04	31·928
1,000 ,,	546	— 0·10	31·82
1,200 ,,	656	— 0·28	31·496
1,400 ,,	765	— 0·34	31·39
1,600 ,,	874	— 0·46	31·17
1,800 ,,	984	— 0·60	39·92
2,000 ,,	1,093	— 0·66	30·81
2,600 ,,	1,421	— 0·74	30·67
2,900 ,,	1,585	— 0·76	30·63
3,000 ,,	1,640	— 0·73	30·69
3,400 ,,	1,859	— 0·69	30·76
3,700 ,,	2,023	— 0·65	30·83
3,800 ,,	2,077	— 0·64	30·85
325 ,,	177	+ 0·49	32·88
		+ 0·85	33·53
		+ 0·76	33·37
		+ 0·78	33·40
		+ 0·62	33·12

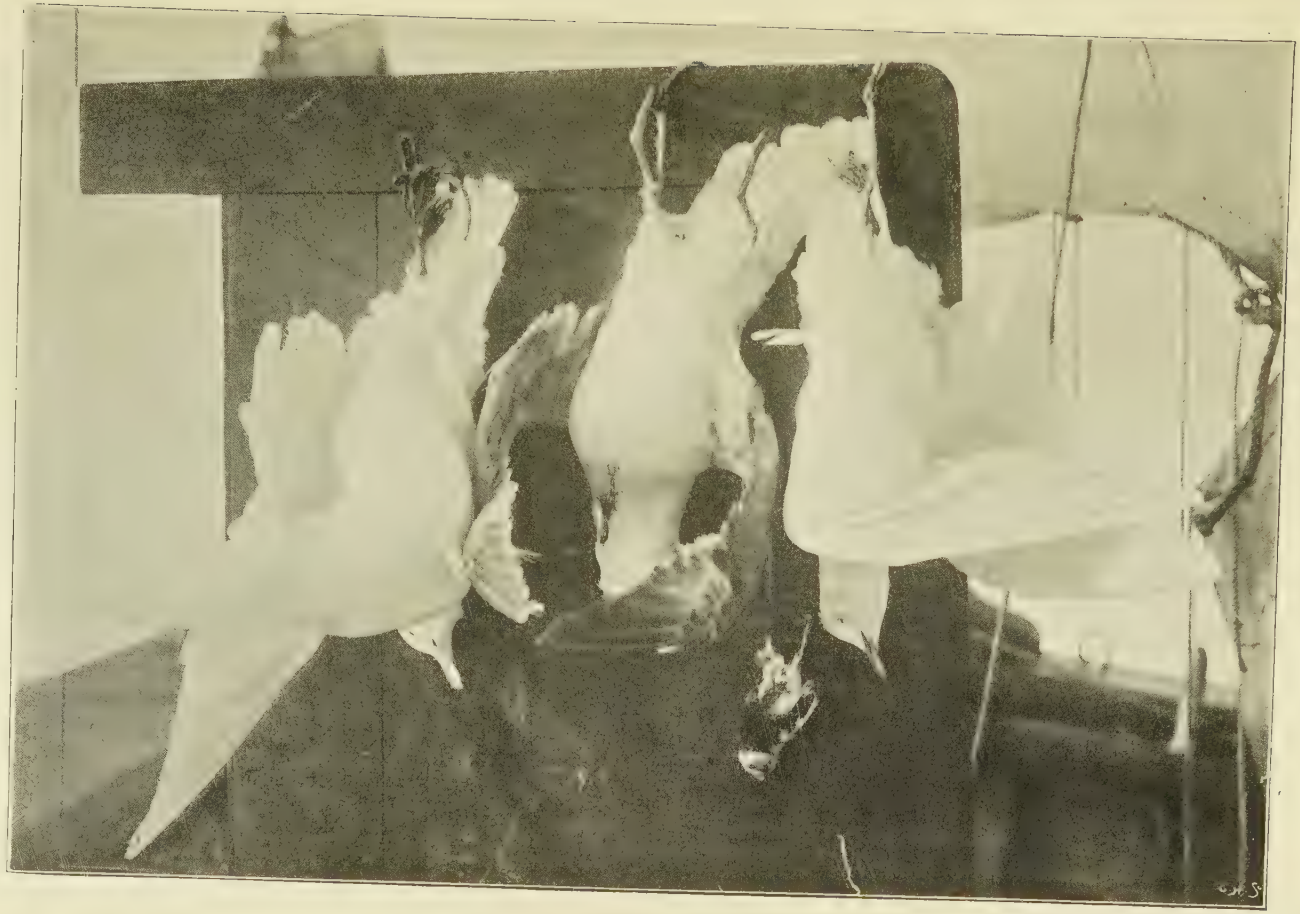
These temperatures of the water are in many respects remarkable. In the first place the temperature falls, as will be seen, from the surface downwards to a depth of 80 metres, after which it rises to 280 metres, falls again at 300 metres, then rises again at 326 metres, where it was + 0·49°; then falls to rise again at 450 metres, then falls steadily down to 2,000 metres, to rise once more slowly at the bottom. Similar risings and fallings were to be found in almost all the series of temperatures taken, and the variations from one month

to another were so small that at the respective depths they often merely amounted to the two-hundredth part of a degree. Occasionally the temperature of the warm strata mounted even higher than mentioned here. Thus on October 17th at 300 metres it was + 0·85°, at 350 metres + 0·76°, at 400 metres + 0·78, and at 500 metres + 0·62°, after which it sank evenly until, towards the bottom, it again rose as before.

We had not expected to meet with much bird life in these desolate regions. Our surprise, therefore, was not small when on Whit Sunday, May 13th, a gull paid us a visit. After that date we regularly saw birds of different kinds in our vicinity, till at last it became a daily occurrence, to which we did not pay any particular attention. For the most part they were ice mews (*larus eburneus*), kittiwakes (*rissa tridactyla*), fulmars (*procellaria glacialis*), and now and then a blue gull (*l. glaucus*), a herring gull (*l. argentatus ?*), or a black guillemot (*uria grylle*); once or twice we also saw a skua (probably *lestris parasitica*), (for instance, on July 14th). On July 21st we had a visit from a snow bunting.

On August 3rd a remarkable occurrence took place, we were visited by the Arctic rose gull (*rhodostethia rosea*). I wrote as follows about it in my diary :—"To-day my longing has at last been satisfied. I have shot Ross's gull,"* three specimens in one day. This rare and

* This gull is often called by this name, after its first discoverer. It has acquired its other name, "rose gull," from its pink colour.



Two Ivory Gulls.
(*Larus eburneus.*)

One Arctic Petrel.
(*Procellaria glacialis.*)

One Snow-Bunting.
(*Plectrophanax nivalis.*)

SUMMER GUESTS.

(*From a photograph.*)

mysterious inhabitant of the unknown north, which is only occasionally seen, and of which no one knows whence it cometh or whither it goeth, which belongs exclusively to the world to which the imagination aspires, is what, from the first moment I saw these tracts, I had always hoped to discover, as my eyes roamed over the lonely plains of ice. And now it came when I was least thinking of it. I was out for a little walk on the ice by the ship, and as I was sitting down by a hummock my eyes wandered northwards and lit on a bird hovering over the great pressure-mound away to the north-west. At first I took it to be a kittiwake, but soon discovered it rather resembled the skua by its swift flight, sharp wings, and pointed tail. When I had got my gun, there were two of them together flying round and round the ship. I now got a closer view of them and discovered that they were too light coloured to be skuas. They were by no means shy, but continued flying about close to the ship. On going after them on the ice I soon shot one of them, and was not a little surprised on picking it up to find it was a little bird about the size of a snipe; the mottled back, too, reminded me also of that bird. Soon after this I shot the other. Later in the day there came another which was also shot. On picking this one up I found it was not quite dead, and it vomited up a couple of large shrimps, which it must have caught in some channel or other. All three were young birds, about 12 inches

in length, with dark mottled grey plumage on the back and wings; the breast and under-side white, with a scarcely perceptible tinge of orange-red, and round the neck a dark ring sprinkled with grey." At a somewhat later age this mottled plumage disappears; they then become blue on the back, with a black ring round the neck, while the breast assumes a delicate pink hue. Some few days afterwards (August 6th and 8th) some more of these birds were shot, making eight specimens in all.

While time was passing on, the plan I had been revolving in my mind during the winter was ever uppermost in my thoughts—the plan, that is to say, of exploring the unknown sea apart from the track in which the *Fram* was drifting. I kept an anxious eye upon the dogs, for fear anything should happen to them, and also to see that they continued in good condition, for all my hopes centered in them. Several of them, indeed, had been bitten to death, and two had been killed by bears; but there were still twenty-six remaining, and as a set-off against our losses we had the puppies, eight of which had been permitted to live. As spring advanced, they were allowed to roam the deck, but on May 5th their world was considerably extended. I wrote thus: "In the afternoon we let the puppies loose on the ice, and 'Kvik' at once took long expeditions with them to familiarise them with their surroundings. First she introduced them to our meteorological apparatus, then to the bear-

RHODOSTETHIA ROSEA.
(*From a photograph.*)

trap, and after that to different pressure-mounds. They were very cautious at first, staring timidly all around, and venturing out very slowly, a step at a time from the ship's side; but soon they began to run riot in their newly-discovered world.

"'Kvik' was very proud to conduct her litter out into the world, and roamed about in the highest of spirits, though she had only just returned from a long driving expedition, in which, as usual, she had done good work in harness. In the afternoon, one of the black and white puppies had an attack of madness. It ran round the ship, barking furiously; the others set on it, and it bit at everything that came in its way. At last we got it shut in on the deck forward, where it was furious for a while, then quieted down, and now seems to be all right again. This makes the fourth that has had a similar attack. What can it possibly be? It cannot be hydrophobia, or it would have appeared among the grown-up dogs. Can it be toothache, or hereditary epilepsy—or some other infernal thing?" Unfortunately, several of them died from these strange attacks. The puppies were such fine, nice animals, that we were all very sorry when a thing like this occurred.

On June 3rd I write:—"Another of the puppies died in the forenoon from one of those mysterious attacks, and I cannot conceal from myself that I take it greatly to heart, and feel low-spirited about it. I have been so used to these small polar creatures living their sorrowless

life on deck, romping and playing around us from morning to evening and a little of the night as well. I can watch them with pleasure by the hour together, or play with them as with little children—have a game at hide and seek with them round the skylight, the while they are beside themselves with glee. It is the largest and strongest of the lot that has just died, a handsome dog; I called him 'Löva' (Lion). He was such a confiding, gentle animal, and so affectionate. Only yesterday he was jumping and playing about and rubbing himself against me, and to-day he is dead. Our ranks are thinning, and the worst of it is we try in vain to make out what it is that ails them. This one was apparently quite in his normal condition and as cheerful as ever until his breakfast was given him; then he began to cry and tear round yelping and barking as if distracted, just as the others had done. After this convulsions set in, and the froth poured from his mouth. One of these convulsions no doubt carried him off. Blessing and I held a *post mortem* upon him in the afternoon, but we could discover no signs of anything unusual. It does not seem to be an infectious ailment. I cannot understand it.

"'Ulenka,' too, the handsomest dog in the whole pack, our consolation and our hope, suddenly became ill the other day. It was the morning of May 24th that we found it paralyzed and quite helpless, lying in its cask on deck. It kept trying to get up but couldn't, and

immediately fell down again—just like a man who has had a stroke and has lost all power over his limbs. It was at once put to bed in a box and nursed most carefully; except for being unable to walk, it is apparently quite well." It must have been a kind of apoplectic seizure that attacked the spinal cord in some spot or other, and paralysed one side of the body. The dog recovered slowly, but never got the complete use of its legs again. It accompanied us, however, on our subsequent sledge expedition.

The dogs did not seem to like the summer, it was so wet on the ice, and so warm. On June 11th I write:—"To-day the pools on the ice all round us have increased wonderfully in size, and it is by no means agreeable to go off the ship with shoes that are not water-tight; it is wetter and wetter for the dogs in the daytime, and they sweat more and more from the heat, though it as yet only rarely rises above zero (C.) A few days ago they were shifted on to the ice, where two long kennels were set up for them."* They were made out of boxes, and really consist of only a wall and a roof. Here they spend the greater part of the twenty-four hours, and we are now rid of all uncleanliness on board, except for the four puppies which still remain, and lead a glorious life of it up there between sleep and play. "Ulenka" is still on deck, and is slowly recovering.

* Up to now they had their kennels on deck.

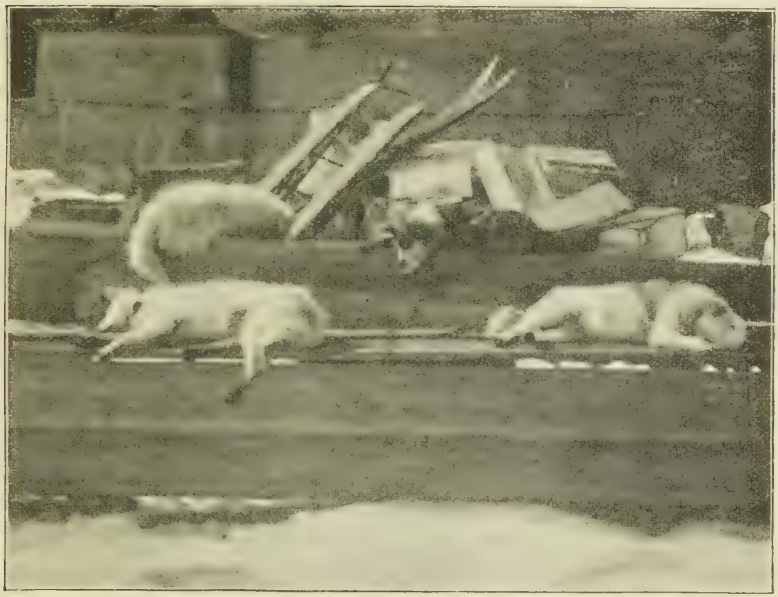
There is the same daily routine for the dogs as in the winter. We let them loose in the morning about half-past eight, and as the time for their release draws near they begin to get very impatient. Every time any one

From a] OUR KENNELS (SEPTEMBER 27TH, 1894). *[Photograph.*

shows himself on deck a wild chorus of howls issues from twenty-six throats, clamouring for food and freedom.

After being let loose they get their breakfast, consisting of half a dried fish, or three biscuits a-piece. The rest

of the forenoon is spent in rooting round among all the refuse heaps they can find ; and they gnaw and lick all the empty tin cases which they have ransacked hundreds of times before. If the cook sends a fresh tin dancing along the ice a battle immediately rages around the prize



THE DOGS BASKING IN THE SUN (JUNE 13TH, 1894).
From a Photograph.

It often happens that one or another of them trying to get at a tempting piece of fat at the bottom of a deep, narrow tin, sticks his head so far down into it that the tin sits fast, and he cannot release himself again ; so with this extinguisher on his head he sprawls about blindly

over the ice, indulging in the most wonderful antics in the effort to get rid of it, to the great amusement of us, the spectators. When tired of their work at the rubbish heaps they stretch out their round, sausage-like bodies, panting in the sun, if there is any, and if it is too warm they get into the shade. They are tied up again before dinner; but "Pan," and others like-minded, sneak away a little before that time, and hide up behind a hummock, so that one can only see a head or an ear sticking up here and there. Should anyone go to fetch him in he will probably growl, show his teeth, or even snap; after which he will lie flat down, and allow himself to be dragged off to prison. The remainder of the twenty-four hours they spend sleeping, puffing and panting in the excessive heat, which, by the way, is two degrees of cold. Every now and then they set up a chorus of howls that certainly must be heard in Siberia, and quarrel amongst themselves till the fur flies in all directions. This removal of the dogs on to the ice has imposed upon the watch the arduous duty of remaining on deck at nights, which was not the practice before. But a bear having once been on board and taken off two of our precious animals, we don't want any more such visitors.

"On July 31st 'Kvik' again increased our population by bringing eleven puppies into the world, one of which was deformed, and was at once killed; two others died later, but most of them grew up and became fine handsome animals. They are still living.

HOME-SICKNESS. 16 JUNE, 1894.

(From a photograph.)

"Few or no incidents occurred during this time, except, naturally, the different red-letter days were celebrated with great ceremony."

May 17th* we observed with special pomp; the following description of which I find in my journal:—

"Friday, May 18th. May 17th was celebrated yesterday with all possible festivity. In the morning we were awakened with organ music—the enlivening strains of the 'College Hornpipe.' After this a splendid breakfast off smoked salmon, ox tongues, etc., etc. The whole ship's company wore bows of ribbon in honour of the day—even old 'Suggen' had one round his tail. The wind whistled, and the Norwegian flag floated on high, fluttering bravely at the masthead. About 11 o'clock the company assembled with their banners on the ice on the port side of the ship, and the procession arranged itself in order. First of all came the leader of the expedition with the 'pure' Norwegian flag;† after him Sverdrup with the *Fram's* pennant, which, with its 'FRAM' on a red ground, 3 fathoms long, looked splendid. Next came a dog-sledge, with the band (Johansen with the accordion), and Mogstad, as coachman; after them came the mate, with rifles and harpoons, Henriksen carrying a long harpoon; then Amundsen and Nordahl, with a red banner. The

* The anniversary of the Norwegian Constitution.

† Without the mark of the "union" with Sweden.

doctor followed, with a demonstration flag in favour of a normal working day. It consisted of a woollen jersey, with the letters 'N. A.'* embroidered on the breast, and at the top of a very long pole it looked most impressive. After him followed our *chef*, Juell, with

From a] THE 17TH OF MAY PROCESSION, 1894. [*Photograph.*

'peik's '† saucepan on his back; and then came the meteorologists, with a curious apparatus, consisting of a large tin scutcheon, across which was fastened a red band,

* "Normal Arbeidsdage" = normal working day.

† The pet name of the cooking range in the galley.

with the letters 'Al. St., signifying 'almindelig stemmeret,' or 'universal suffrage.'"*

"At last the procession began to move on. The dogs marched demurely, as if they had never done anything else in all their lives than walk in procession, and the band played a magnificent festive march, not composed for the occasion. The stately cortége marched twice round the *Fram*, after which with great solemnity it moved off in the direction of the large hummock, and was photographed on the way by the photographer of the expedition. At the hummock a hearty cheer was given for the *Fram*, which had brought us hither so well, and which would, doubtless, take us equally well home again. After this the procession turned back, cutting across the *Fram's* bow. At the port gangway a halt was called, and the photographer, mounting the bridge, made a speech in honour of the day. This was succeeded by a thundering salute, consisting of six shots, the result of which was that five or six of the dogs rushed off over hummocks and pressure-ridges, and hid themselves for several hours. Meanwhile we went down into the cosy cabin, decorated with flags for the

* Up to this day I am not quite clear as to what these emblems were intended to signify. That the doctor, from want of practice, would have been glad of a normal day's work ("normal Arbeidsdag") can readily be explained, but why the meteorologists should cry out for universal suffrage passes my comprehension. Did they want to overthrow despotism?

occasion in a right festive manner, where we partook of a splendid dinner, preluded by a lovely valse. The *menu* was as follows :—Minced fish with curried lobster, melted butter and potatoes ; music ; pork cutlets, with green peas, potatoes, mango chutney, and Worcester sauce ; music ; apricots and custard, with cream ; much music. After this a siesta ; then coffee, currants, figs, cakes ; and the photographer stood cigars. Great enthusiasm, then more siesta. After supper the violinist, Mogstad, gave a recital, when refreshments were served in the shape of figs, sweetmeats, apricots, and gingerbread (honey cakes). On the whole a charming and very successful Seventeenth of May, especially considering that we had passed the 81st degree of latitude.

"Monday, May 28th. Ugh, I am tired of these endless, white plains—cannot even be bothered snow-shoeing over them, not to mention that the lanes stop one on every hand. Day and night I pace up and down the deck, along the ice by the ship's sides, revolving the most elaborate scientific problems. For the past few days it is especially the shifting of the Pole that has fascinated me. I am beset by the idea that the tidal wave, along with the unequal distribution of land and sea, must have a disturbing effect on the situation of the earth's axis. When such an idea gets into one's head, it is no easy matter to get it out again. After pondering over it for several days, I have finally discovered that the influence of the moon

on the sea must be sufficient to cause a shifting of the Pole to the extent of one minute in 800,000 years. In order to account for the European Glacial Age, which was my main object, I must shift the Pole at least ten or twenty degrees. This leaves an uncomfortably wide interval of time since that period, and shows that the human race must have attained a respectable age. Of course, it is all nonsense. But while I am indefatigably tramping the deck in a brown study, imagining myself no end of a great thinker, I suddenly discover that my thoughts are at home, where all is summer and loveliness, and those I have left are busy building castles in the air for the day when I shall return. Yes, yes. I spend rather too much time on this sort of thing; but the drift goes as slowly as ever, and the wind, the all-powerful wind, is still the same. The first thing my eyes look for when I set foot on deck in the morning is the weathercock on the mizentop, to see how the wind lies; thither they are for ever straying during the whole day, and there again they rest, the last thing before I turn in. But it ever points in the same direction, west and south-west, and we drift now quicker, now more slowly westwards, and only a little to the north. I have no doubt now about the success of the expedition, and my miscalculation was not so great after all; but I scarcely think we shall drift higher than 85°, even if we do that. It will depend on how far Franz Josef Land extends to the north. In that case it will be hard to give up reaching the Pole; it

is in reality a mere matter of vanity, merely child's play, in comparison with what we are doing and hoping to do; and yet I must confess that I am foolish enough to want to take in the Pole while I am about it, and shall probably have a try at it if we get into its neighbourhood within any reasonable time.

"This is a mild May; the temperature has been about zero several times of late, and one can walk up and down and almost imagine one's self at home. There is seldom more than a few degrees of cold; but the summer fogs are beginning, with occasional hoar frost. As a rule, however, the sky with its light, fleeting clouds is almost like a spring sky in the south.

"We notice, too, that it has become milder on board; we no longer need to light a fire in the stove to make ourselves warm and cosy; though, indeed, we have never indulged in much luxury in this respect. In the store-room, the rime frost and ice that had settled on the ceiling and walls are beginning to melt; and in the compartments astern of the saloon, and in the hold, we have been obliged to set about a grand cleaning-up, scraping off and sweeping away the ice and rime, to save our provisions from taking harm, through the damp penetrating the wrappings, and rusting holes in the tin cases. We have, moreover, for a long time kept the hatchways in the hold open, so that there has been a thorough draught through it, and a good deal of the rime has evaporated. It is remarkable

how little damp we have on board. No doubt this is due to the *Fram's* solid construction, and to the deck over the hold being panelled on the underside. I am getting fonder and fonder of this ship."

"Saturday, June 9th. Our politician, Amundsen, is celebrating the day with a white shirt and collar.* To-day I have moved with my work up into the deck-house again, where I can sit and look out of the window in the day-time, and feel that I am living in the world and not in a cavern, where one must have lamplight night and day. I intend remaining here as long as possible out into the winter: it is so cosy and quiet, and the monotonous surroundings are not constantly forcing themselves in upon me.

"I really have the feeling that summer has come. I can pace up and down the deck by the hour together with the sun, or stand still and roast myself in it, while I smoke a pipe, and my eyes glide over the confused masses of snow and ice. The snow is everywhere wet now, and pools are beginning to form every here and there. The ice too is getting more and more permeated with salt water; if one bores ever so small a hole in it, it is at once filled with water. The reason, of course, is that owing to the rise in the temperature, the particles of salt contained in the ice begin to melt their sur-

* With reference to the resolution of the Storthing, on June 9th, 1880.

roundings, and more and more water is formed with a good admixture of salt in it, so that its freezing point is lower than the temperature of the ice around it. This, too, had risen materially ; at about 4 feet depth it is only 25·2° F. (— 3·8° C.), at 5 feet it is somewhat warmer again, 26·5° F. (— 3·1° C.).

"Sunday, June 10th. Oddly enough we have had no cases of snow-blindness on board, with the exception of the doctor, who, a couple of days ago, after we had been playing at ball, got a touch of it in the evening. The tears poured from his eyes for some time, but he soon recovered. Rather a humiliating trick of fate that he should be the first to suffer from this ailment." Subsequently we had a few isolated cases of slight snow-blindness, so that one or two of our men had to go about with dark spectacles ; but it was of little importance and was due to their not thinking it worth while to take the necessary precautions.

"Monday, June 11th. To-day I made a joyful discovery. I thought I had begun my last bundle of cigars and calculated that by smoking one a day they would last a month, but found quite unexpectedly a whole box in my locker. Great rejoicing! it will help to while away a few more months, and where shall we be then ? Poor fellow, you are really at a low ebb! 'To while away time'—that is an idea that has scarcely ever entered your head before. It has always been your great trouble that time flew away so fast, and now it

A SUMMER SCENE. 21 JULY, 1894.

(From a photograph.)

cannot go fast enough to please you. And then so addicted to tobacco—you wrap yourself in clouds of smoke to indulge in your everlasting day dreams. Hark to the south wind, how it whistles in the rigging; it is quite inspiriting to listen to it. On Midsummer Eve we ought, of course, to have had a bonfire as usual, but from my diary it does not seem to have been the sort of weather for it.

"Saturday, June 23rd, 1894.

> "'Mid the shady vales, and the leafy trees,
> How sweet the approach of the summer breeze;
> When the mountain slopes in the sunlight gleam,
> And the eve of St. John comes in like a dream.

The north wind continues with sleet. Gloomy weather. Drifting south. 81° 43′ N. lat., that is 9′ southward since Monday.

"I have seen many midsummer eve's under different skies, but never such a one as this. So far, far from all that one associates with this evening. I think of the merriment round the bonfires at home, hear the scraping of the fiddle, the peals of laughter, and the salvoes of the guns, with the echoes answering from the purple tinted heights. And then I look out over this boundless, white expanse into the fog and sleet, and the driving wind. Here is truly no trace of midsummer merriment. It is a gloomy look-out altogether! Midsummer is past—and now the days are shortening again, and the long night of

winter approaching, which, maybe, will find us as far advanced as it left us.

"I was busily engaged with my examination of the salinity of the sea water this afternoon, when Mogstad stuck his head in at the door, and said that a bear must be prowling about in the neighbourhood. On returning after dinner to their work at the great hummock, where they were busy making an ice-cellar for fresh meat,* the men found bear tracks which were not there before. I put on my snow-shoes and went after it. But what terrible going it had been the last few days! Soft slush, in which the snow-shoes sink helplessly. The bear had come from the west right up to the *Fram*, had stopped and inspected the work that was going on, had then retreated a little, made a considerable detour, and set off eastwards at its easy, shambling gait, without deigning to pay any further attention to such a trifle as a ship. It had rummaged about in every hole and corner where there seemed to be any chance of finding food, and had rooted in the snow after anything the dogs had left, or whatever else it might be. It had then gone to the

* It was seal, walrus, and bear's flesh from last autumn, which was used for the dogs. During the winter it had been hung up in the ship, and was still quite fresh. But henceforth it was stored on the ice until, before autumn set in, it was consumed. It is remarkable how well meat keeps in these regions. On June 28th we had reindeer-steak for dinner that we had killed on the Siberian coast in September of the previous year.

lanes in the ice, and skirted them carefully, no doubt in the hope of finding a seal or two, and after that it had gone off between the hummocks and over floes, with a surface of nothing but slush and water. Had the surface been good I should no doubt have overtaken Master Bruin, but he had too long a start in the slushy snow.

"A dismal, dispiriting landscape—nothing but white and grey. No shadows—merely half obliterated forms melting into the fog and slush. Everything is in a state of disintegration, and one's foothold gives way at every step. It is hard work for the poor snow-shoer who stamps along through the slush and fog after bear tracks that wind in and out among the hummocks, or over them. The snow-shoes sink deep in, and the water often reaches up to the ankles, so that it is hard work to get them up or to force them forward; but without them one would be still worse off.

"Every here and there this monotonous greyish-whiteness is broken by the coal-black water, which winds, in narrower or broader lanes, in between the high hummocks. White, snow-laden floes and lumps of ice float on the dark surface, looking like white marble on a black ground. Occasionally there is a larger dark-coloured pool, where the wind gets a hold of the water and forms small waves that ripple and plash against the edge of the ice, the only signs of life in this desert tract. It is like an old friend the sound of these playful wavelets! And here, too, they eat away the floes and hollow

out their edges. One could almost imagine one's self in more southern latitudes. But all around is wreathed with ice, towering aloft in its ever-varying fantastic forms, in striking contrast to the dark water on which a moment before the eye had rested. Everlastingly is this shifting ice modelling, as it were, in pure, grey marble, and, with nature's lavish prodigality, strewing around the most glorious statuary which perishes, without any eye having seen it. Wherefore? To what end all this shifting pageant of loveliness? It is governed by the mere caprices of nature, following out those everlasting laws, that pay no heed to what we regard as aims and objects.

"In front of me towers one pressure-ridge after another, with lane after lane between. It was in June the *Jeannette* was crushed and sank; what if the *Fram* were to meet her fate here! No, the ice will not get the better of her. Yet, if it should in spite of everything! As I stood gazing around me I remembered it was Midsummer Eve. Far away yonder, her masts pointed aloft, half lost to view in the snowy haze. They must, indeed, have stout hearts those fellows on board that craft. Stout hearts, or else blind faith in a man's word.

"It is all very well that he who has hatched a plan, be it never so wild, should go with it to carry it out; he naturally does his best for the child to which his thoughts have given birth. But they—they had no child to tend,

THE STERN OF THE FRAM. JOHANSEN AND "SULTAN." 16 JUNE, 1894.

(From a photograph.)

and could, without feeling any yearning baulked, have refrained from taking part in an expedition like this. Why should any human being renounce life to be wiped out here?"

"Sunday, June 24th. The anniversary of our departure from home. Northerly wind; still drifting south. Observations to-day gave 81° 41′ 7″ N. lat., so we are not going at a breakneck speed.

"It has been a long year—a great deal has been gone through in it—though we are quite as far advanced as I had anticipated. I am sitting, and look out of the window at the snow, whirling round in eddies as it is swept along by the north wind. A strange Midsummer Day! One might think we had had enough of snow and ice; I am not, however, exactly pining after green fields—at all events, not always. On the contrary, I find myself sitting by the hour laying plans for other voyages into the ice after our return from this one. . . . Yes, I know what I have attained, and, more or less, what awaits me. It is all very well for me to sketch plans for the future. But those at home. . . . No, I am not in a humour for writing this evening; I will turn in."

"Wednesday, July 11th. Lat. 81° 18′ 8″. At last the southerly wind has returned, so there is an end of drifting south for the present.

"Now I am almost longing for the polar night, for the everlasting wonderland of the stars with the spectral

northern lights, and the moon sailing through the profound silence. It is like a dream, like a glimpse into the realms of fantasy. There are no forms, no cumbrous reality—only a vision woven of silver and violet ether, rising up from earth and floating out into infinity. . . . But this eternal day, with its oppressive actuality, interests me no longer—does not entice me out of my lair. Life is one incessant hurrying from one task to another, everything must be done and nothing neglected, day after day, week after week; and the working day is long, seldom ending till far over midnight. But through it all runs the same sensation of longing and emptiness, which must not be noted. Ah, but at times there is no holding it aloof, and the hands sink down without will or strength—so weary, so unutterably weary.

"Ah! life's peace is said to be found by holy men in the desert. Here, indeed, there is desert enough; but peace—of that I know nothing. I suppose it is the holiness that is lacking.

"Wednesday, July 18th. Went on excursion with Blessing in the forenoon to collect specimens of the brown snow and ice, and gather seaweed and diatoms in the water. The upper surface of the floes is nearly everywhere of a dirty brown colour, or, at least, this sort of ice preponderates, while pure white floes, without any traces of a dirty brown on their surface, are rare. I imagined this brown colour must be due to the organisms I found in the newly-frozen, brownish-red

ice last autumn (October); but the specimens I took to-day consist for the most part of mineral dust mingled with diatoms and other ingredients of organic origin.*

From a] BLESSING GOES OFF IN SEARCH OF ALGÆ. [*Photograph.*

"Blessing collected several specimens on the upper surface of the ice earlier in the summer, and came to the same conclusions. I must look farther into this, in

* The same kind of dust that I found on the ice on the east coast of Greenland, which is mentioned in the Introduction to this book, p. 33.

order to see whether all this brown dust is of a mineral nature, and consequently originates from the land.* We found in the lanes quantities of algæ like what we had often found previously. There were large accumulations of them in nearly every little channel. We could also see that a brown surface layer spread itself on the sides of the floes far down into the water. This is due to an alga that grows on the ice. There were also floating in the water a number of small viscid lumps, some white, some of a yellowish-red colour; and of these I collected several. Under the microscope they all appeared to consist of accumulations of diatoms, among which, moreover, were a number of larger cellular organisms of a very characteristic appearance.† All of these diatomous accumulations kept at a certain depth, about a yard below the surface of the water; in some of the small lanes they appeared in large

* This dust, which is to be seen in summer on the upper surface of almost all polar ice of any age, is, no doubt, for the most part, dust that hovers in the earth's atmosphere. It probably descends with the falling snow, and gradually accumulates into a surface layer as the snow melts during the summer. Larger quantities of mud, however, are also often to be found on the ice, which strongly resemble this dust in colour, but are doubtless more directly connected with land, being formed on floes that have originally lain in close proximity to it. (Compare *Wissensch. Ergebnisse von Dr. F. Nansens durchquerung von Grönland. Ergänzungsheft No.* 105, *zu Petermanns Mittheilungen.*)

† I have not yet had time to examine them closely.

PETER HENRIKSEN IN A BROWN STUDY. 6 JULY, 1894.

(From a photograph.)

masses. At the same depth the above-named alga seemed especially to flourish, while parts of it rose up to the surface. It was evident that these accumulations of diatoms and alga remained floating exactly at the depth

From a] BLESSING FISHING FOR ALGÆ. [*Photograph.*

where the upper stratum of fresh water rests on the sea water. The water on the surface was entirely fresh, and the masses of diatoms sank in it, but floated on reaching the salt water below.

"Thursday, July 19th. It is as I expected. I am beginning to know the ways of the wind up here pretty well now. After having blown a 'windmill breeze'

PRESSURE-RIDGE ON THE PORT QUARTER OF THE "FRAM" (JULY 1ST, 1894).

(From a Photograph.)

to-day it falls calm in the evening, and to-morrow we shall probably have wind from the west or north-west.

"Yesterday evening the last cigar out of the old box!

And now I have smoked the first out of the last box I have got. We were to have got so far by the time that box was finished; but are scarcely any further advanced than when I began it, and goodness knows if we shall be that when this, too, has disappeared. But enough of that. Smoke away."

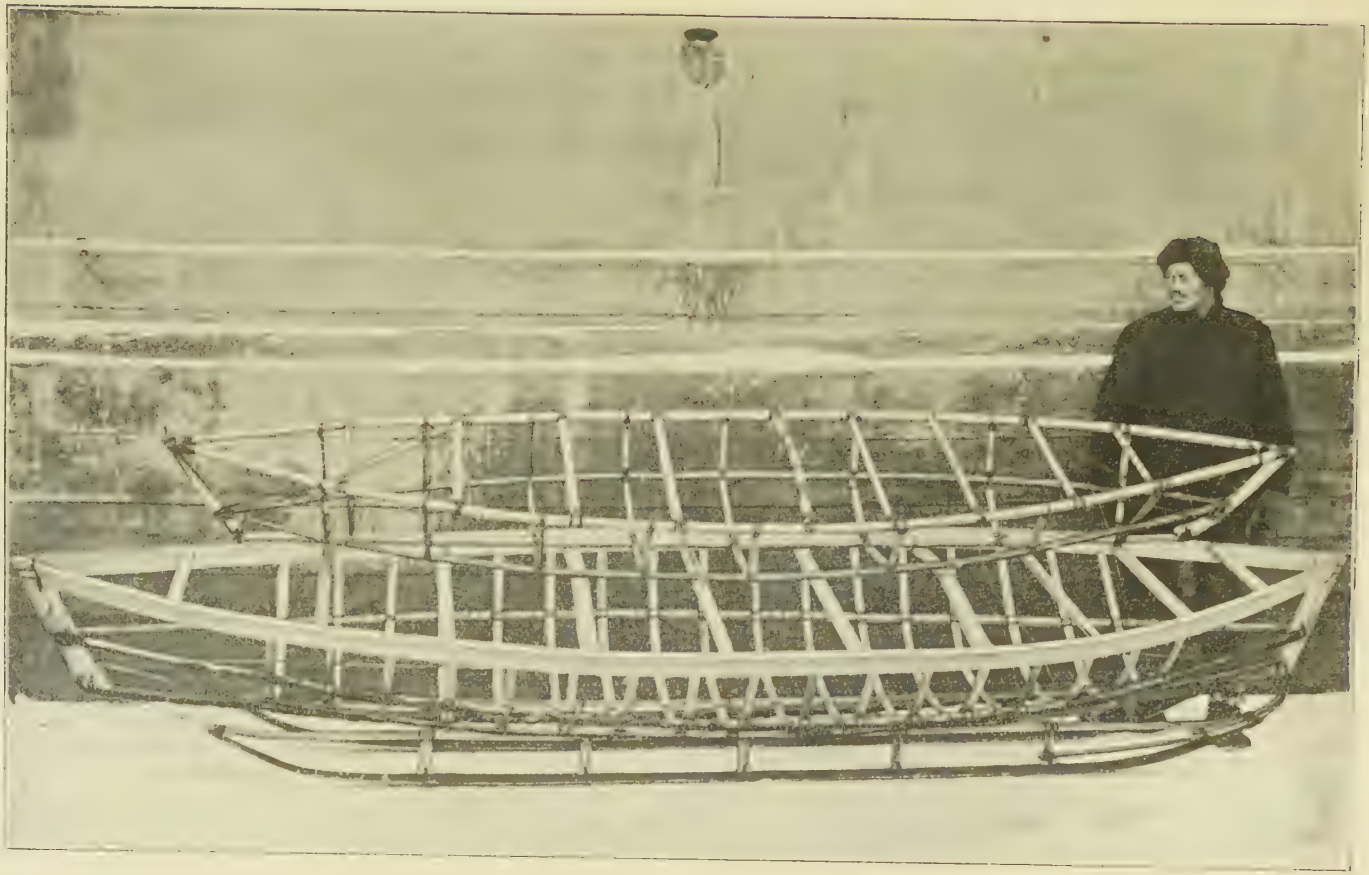
"Sunday, July 22nd. The north-west wind did not come quite up to time; on Friday we had north-east instead, and during the night it gradually went round to N.N.E., and yesterday forenoon it blew due north. To-day it has ended in the west, the old well known quarter, of which we have had more than enough. This evening the line* shows about N.W. to N., and it is strong, so we are moving south again.

"I pass the day at the microscope. I am now busied with the diatoms and algæ of all kinds that grow on the ice in the uppermost fresh stratum of the sea. These are undeniably most interesting things, a whole new world of organisms that are carried off by the ice from known shores across the unknown Polar Sea, there to awaken every summer, and develop into life and bloom. Yes, it is very interesting work, but yet there is not that same burning interest as of old, although the scent of oil of cloves, Canada balsam, and wood-oil, awakens many

* We always had a line, with a net at the end, hanging out, in order to see the direction we were drifting in, or to ascertain whether there was any perceptible current in the water.

dear reminiscences of that quiet laboratory at home, and every morning as I come in here the microscope and glasses and colours on the table invite me to work. But though I work indefatigably day after day till late in the night, it is mostly duty work, and I am not sorry when it is finished, to go and lie for some few hours in my berth reading a novel and smoking a cigar. With what exultation would I not throw the whole aside, spring up, and lay hold of real life, fighting my way over ice and sea with sledges, boats, or kayaks. It is more than true that it is 'easy to live a life of battle'; but here there is neither storm nor battle, and I thirst after them. I long to enlist titanic forces and fight my way forward—that would be living! But what pleasure is there in strength when there is nothing for it to do? Here we drift forward, and here we drift back, and now we have been two months on the same spot.

"Everything, however, is being got ready for a possible expedition, or for the contingency of its becoming necessary to abandon the ship. All the hand-sledges are lashed together, and the iron fittings carefully seen to. Six dog-sledges are also being made, and to-morrow we shall begin building 'kayaks' ready for the men. They are easy to draw on hand-sledges in case of a retreat over the ice without the ship. For a beginning we are making 'kayaks' to hold two men each. I intend to have them about 12 feet long, 3 feet wide, and 18 inches in depth. Six of these are to be made. They are to be



SKELETONS OF A KAYAK FOR ONE MAN (BAMBOO), AND OF A DOUBLE KAYAK, LYING ON A HAND-SLEDGE.

(From a photograph)

covered with sealskin or sailcloth, and to be decked all over, except for two holes—one for each man.

"I feel that we have, or rather shall have, everything needful for a brilliant retreat. Sometimes I seem almost to be longing for a defeat—a decisive one—so that we might have a chance of showing what is in us, and putting an end to this irksome inactivity.

"Monday, July 30th. Westerly wind, with north-westerly by way of a pleasant variety; such is our daily fare week after week. On coming up in the morning, I no longer care to look at the weather-cock on the mast-head, or at the line in the water; for I know beforehand that the former points east or south-east, and the line in the contrary direction, and that we are ever bearing to the south-east. Yesterday it was 81° 7′ N. lat., the day before 81° 11′, and last Monday, July 25th, 81° 26′.

"But it occupies my thoughts no longer. I know well enough there will be a change some time or other, and the way to the stars leads through adversity. I have found a new world; and that is the world of animal and plant life that exists in almost every fresh-water pool on the ice-floes. From morning till evening and till late in the night I am absorbed with the microscope, and see nothing around me; I live with these tiny beings in their separate universe, where they are born and die, generation after generation, where they pursue each other in the struggle for life, and carry on their love affairs with the same feelings, the same sufferings,

and the same joys that permeate every living being, from these microscopic animalcules up to man—self-preservation and propagation, that is the whole story. Fiercely, as we human beings struggle to push our way on through the labyrinth of life, their struggles are assuredly no less fierce than ours—one incessant, restless hurrying to and fro, pushing all others aside, to burrow out for themselves what is needful to them. And as to love, only mark with what passion they seek each other out. With all our brain-cells we do not feel more strongly than they, never live so entirely for a sensation. But what is life? What matters the individual's suffering so long as the struggle goes on.

"And these are small, one-celled lumps of viscous matter, teeming in thousands and millions, on nearly every single floe over the whole of this boundless sea, which we are apt to regard as the realm of death. Mother Nature has a remarkable power of producing life everywhere—even this ice is a fruitful soil for her.

"In the evening a little variety occurred in our uneventful existence, Johansen having discovered a bear to the south-east of the ship, but out of range. It had, no doubt, been prowling about for some time while we were below at supper, and had been quite near us; but being alarmed by some sound or other, had gone off eastwards. Sverdrup and I set out after it, but to no purpose; the lanes hindered us too much, and more-

over a fog came on, so that we had to return after having gone a good distance."

The world of organisms I above alluded to was the subject of special research through the short summer, and in many respects was quite remarkable. When the sun's rays had gained power on the surface of the ice, and melted the snow, so that pools were formed, there was soon to be seen at the bottom of these pools small yellowish-brown spots, so small that at first one hardly noticed them. Day by day they increased in size, and absorbing, like all dark substances, the heat of the sun's rays, they gradually melted the underlying ice and formed round cavities, often several inches deep. These brown spots were the above mentioned algæ and diatoms. They developed speedily in the summer light, and would fill the bottoms of the cavities with a thick layer. But there were not plants only, the water also teemed with swarms of animalcules, mostly infusoria and flagellata, which subsisted on the plants. I actually found bacteria —even these regions are not free from them!

But I could not always remain chained by the microscope. Sometimes when the fine weather tempted me irresistibly, I had to go out and bake myself in the sun, and imagine myself in Norway.

"Saturday, August 4th. Lovely weather yesterday and to-day. Light, fleecy clouds sailing high aloft through the sparkling, azure sky—filling one's soul with longings to soar as high and as free as they. I have just

been out on deck this evening; one could almost imagine oneself at home by the fjord. Saturday evening's peace seemed to rest on the scene and on one's soul.

"Our sailmakers, Sverdrup and Amundsen, have to-day finished covering the first double kayak with sail-cloth. Fully equipped, it weighs 30·5 kilos. (60 lbs.). I think it will prove a first rate contrivance. Sverdrup and I tried it on a pool. It carried us splendidly, and was so stiff that even sitting on the deck we could handle it quite comfortably. It will easily carry two men with full equipment for 100 days. A handier or more practical craft for regions like this I cannot well imagine."

"Sunday, August 5th. 81° 7·3′ N. lat.

> "I can't forget the sparkling fjord
> When the church boat rows in the morning."

"Brilliant summer weather. I bathe in the sun and dream I am at home either on the high mountains or —heaven knows why—on the fjords of the west coast. The same white fleecy clouds in the clear blue summer sky; heaven arches itself overhead like a perfect dome, there is nothing to bar one's way, and the soul rises up unfettered beneath it. What matters it that the world below is different, the ice no longer single glittering glaciers, but spread out on every hand? Is it not these same fleecy clouds far away in the blue expanse that the eye looks for at home on a bright summer day? Sailing on these, fancy steers its course

NANSEN TAKES A WALK. 6 JULY, 1894.

(From a photograph.)

to the land of wistful longing. And it is just at these glittering glaciers in the distance that we direct our longing gaze. Why should not a summer day be as lovely here? Ah, yes! it is lovely, pure as a dream, without desire, without sin, a poem of clear white sunbeams refracted in the cool crystal blue of the ice. How unutterably delightful does not this world appear to us on some stifling summer day at home?

"Have rested and 'kept Sunday.' I could not remain in the whole day, so took a long trip over the ice. Progress is easy except for the lanes.

"Hansen practised kayak-paddling this afternoon on the pool around the ship, from which several channels diverge over the ice, but he was not content with paddling round in them, but must, of course, make an experiment in capsizing and recovering himself as the Eskimos do. It ended by his not coming up again, losing his paddle, remaining head downwards in the water, and beating about with his hands till the 'kayak' filled, and he got a cold bath from top to toe. Nordahl, who was standing by on the ice to help him, at last found it necessary to go in after him and raise him up on an even keel again, to the great amusement of us others.

"One can notice that it is summer. This evening a game of cards is being played on deck, with 'Peik's'*

* The name given to the cooking-stove.

big pot for a card-table. One could almost think it was an August evening at home; only the toddy is wanting, but the pipes and cigars we have."

"Sunday, August 12th. We had a shooting competition in the forenoon.

"A glorious evening. I took a stroll over the ice among the lanes and hummocks. It was so wonderfully calm and still. Not a sound to be heard but the drip, drip of water from a block of ice, and the dull sound of a snow-slip from some hummock in the distance. The sun is low down in the north, and overhead is the pale blue dome of heaven, with gold-edged clouds. The profound peace of the Arctic solitudes. My thoughts fly free and far. If one could only give utterance to all that stirs one's soul on such an evening as this! What an incomprehensible power one's surroundings have over one!

"Why is it that at times I complain of the loneliness? With Nature around one, with one's books and studies, one can never be quite alone."

"Thursday, August 16th. Yesterday evening, as I was lying in my berth reading, and all except the watch had turned in, I heard the report of a gun on deck over my head. Thinking it was a bear, I hurriedly put on my sea boots and sprang on deck. There I saw Johansen bare-headed, rifle in hand. 'Was it you that fired the shot?' 'Yes. I shot at the big hummock yonder—I thought something was stirring there, and

I wanted to see what it was, but it seems to have been nothing.' I went to the railings, and looked out. 'I fancied it was a bear that was after our meat—but it was nothing.' As we stood there one of the dogs came jogging along from the big hummock. 'Then you see what you have shot at,' I said, laughing. 'I'm bothered if it wasn't a dog!' he replied. 'Ice-bear' it was, true enough, for so we called this dog. It had seemed so large in the fog, scratching at the meat-hummock. 'Did you aim at the dog and miss? That was a lucky chance!' 'No! I simply fired at random in that direction, for I wanted to see what it was.' I went below and turned in again. At breakfast to-day he had, of course, to run the gauntlet of some sarcastic questions about his 'harmless thunder-bolt,' but he parried them adroitly enough.

"Tuesday, August 21. North latitude, 81° 4·2′. Strange how little alteration there is—we drift a little to the north, then a little to the south, and keep almost to the same spot. But I believe, as I have believed all along, since before we even set out, that we should be away three years, or rather three winters and four summers, neither more nor less, and that in about two years' time from this present autumn we shall reach home.* The approaching winter will drift us further,

* It was two years later to a day that the *Fram* put in at Skjervö, on the coast of Norway.

however slowly, and it begins already to announce itself, for there were four degrees of cold last night."

"Sunday, August 26th, It seems almost as if winter had come, the cold has kept on an average between 24·8° F. (−4° C.) and 21·2° F. (−6° C.) since Thursday. There are only slight variations in the temperature up here, so we may expect it to fall regularly from this time forth, though it is rather early for winter to set in. All the pools and lanes are covered with ice, thick enough to bear a man, even without snow-shoes.

"I went out on my snow-shoes both morning and afternoon. The surface was beautiful everywhere. Some of the lanes had opened out, or been compressed a little, so that the new ice was thin, and bent unpleasantly under the snow-shoes; but it bore me, though two of the dogs fell through. A good deal of snow had fallen, so there was fine, soft new snow to travel over. If it keeps on as it is now, there will be excellent snow-shoeing in the winter; for it is fresh water that now freezes on the surface, so that there is no salt that the wind can carry from the new ice to spoil the snow all around, as was the case last winter. Such snow with salt in it makes as heavy a surface as sand.

"Monday, August 27th. Just as Blessing was going below after his watch to-night, and was standing by the rail looking out, he saw a white form that lay rolling in the snow a little way off to the south-east. Afterwards it remained for a while lying quite still. Johansen, who

A SUMMER EVENING. 14 JULY, 1894.

(From a photograph.)

was to relieve Blessing, now joined him, and they both stood watching the animal intently. Presently it got up, so there was no longer any doubt as to what it was. Each got hold of a rifle and crept stealthily towards the forecastle, where they waited quietly while the bear cautiously approached the ship, making long tacks against the wind. A fresh breeze was blowing, and the windmill going round at full speed; but this did not alarm him at all; very likely it was this very thing he wanted to examine. At last he reached the lane in front, when they both fired and he fell down dead on the spot. It was nice to get fresh meat again. This was the first bear we had shot this year, and of course we had roast bear for dinner to-day. Regular winter with snowstorms."

"Wednesday, August 29th. A fresh wind; it rattles and pipes in the rigging aloft. An enlivening change and no mistake! The snow drifts as if it were mid-winter. Fine August weather! But we are bearing north again, and we have need to! Yesterday our latitude was 80° 53·5′. This evening I was standing in the hold at work on my new bamboo kayak, which will be the very acme of lightness. Pettersen happened to come down and gave me a hand with some lashings that I was busy with. We chatted a little about things in general; and he was of opinion 'that we had a good crib of it on board the *Fram*, because here we had everything we wanted, and she was a devil of a ship—

and any other ship would have been crushed flat long ago.' But for all that he would not be afraid, he said, to leave her, when he saw all the contrivances, such as these new kayaks, we had been getting ready. He was sure no former expedition had ever had such contrivances, or been so equipped against all possible emergencies as we. But, after all, he would prefer to return home on the *Fram*." Then we talked about what we should do when we did get home.

"'Oh, for your part, no doubt you'll be off to the South Pole,' he said.

"'And you?' I replied. 'Will you tuck up your sleeves and begin again at the old work?'

"'Oh, very likely! but on my word I ought to have a week's holiday first. After such a trip I should want it, before buckling to at the sledge hammer again.'"

CHAPTER VIII.

Second Autumn in the Ice.

So summer was over, and our second autumn and winter were beginning. But we were now more inured to the trials of patience attendant on this life, and time passed quickly. Besides, I myself was now taken up with new plans and preparations. Allusion has several times been made to the fact that we had, during the course of the summer, got everything into readiness for the possibility of having to make our way home across the ice. Six double kayaks had been built, the hand sledges were in good order, and careful calculation had been made of the amount of food, clothing, fuel, etc., that it would be necessary to carry. But I had also quietly begun to make preparations for my own meditated expedition north. In August, as already mentioned, I had begun to work at a single kayak, the framework made of bamboo. I had said nothing about my plan yet, except a few words to Sverdrup ; it was impossible to tell how far north the drift would take us, and so many things might happen before spring.

In the meantime life on board went on as usual. There were the regular observations and all sorts of occupations, and I myself was not so absorbed in my plans that I did not find time for other things too. Thus I see from my diary that in the end of August and in September I must have been very proud of a new invention that I made for the galley. All last year we had cooked on a particular kind of copper range, heated by petroleum lamps. It was quite satisfactory, except that it burned several quarts of petroleum a day. I could not help fearing sometimes that our lighting supply might run short, if the expedition lasted longer than was expected, and always wondered if it would not be possible to construct an apparatus that would burn coal-oil—"black-oil," as we call it on board—of which we had 20 tons, originally intended for the engine. And I succeeded in making such an apparatus. On August 30th I write: "Have tried my newly-invented coal-oil apparatus for heating the range, and it is beyond expectation successful. It is splendid that we shall be able to burn coal-oil in the galley. Now there is no fear of our having to cry ourselves blind for lack of light bye-and-bye. This adds more than 4,000 gallons to our stock of oil; and we can keep all our fine petroleum now for lighting purposes, and have lamps for many a year, even if we are a little extravagant. The 20 tons of coal-oil ought to keep the range going for 4 years, I think.

"The contrivance is as simple as possible. From a

reservoir of oil a pipe leads down and in to the fireplace; the oil drips down from the end of this pipe into an iron bowl, and is here sucked up by a sheet of asbestos, or by coal ashes. The flow of oil from the pipe is regulated by a fine valve cock. To ensure a good draught, I bring a ventilating pipe from outside right by the range door. Air is pressed through this by a large wind-sail on deck, and blows straight on to the iron bowl, where the oil burns briskly with a clear, white flame. Whoever lights the fire in the morning has only to go on deck and see that the wind-sail is set to the wind, to open the ventilator, to turn the cock so that the oil runs properly, and then set it burning with a scrap of paper. It looks after itself, and the water is boiling in twenty minutes or half-an-hour. One could not have anything much easier than this, it seems to me. But of course in our as in other communities, it is difficult to introduce reforms; everything new is looked upon with suspicion."

Somewhat later I write of the same apparatus: "We are now using the galley again, with the coal-oil fire; the moving down took place the day before yesterday,* and the fire was used yesterday. It works capitally; a 3-foot wind is enough to give a splendid draught. The day before yesterday, when I was sitting with some

* During the summer we had made a kitchen of the chart-room on deck, because of the good daylight there; and besides the galley proper was to be cleaned and painted

of the others in the saloon in the afternoon, I heard a dull report out in the galley, and said at once that it sounded like an explosion. Presently Pettersen* stuck a head in at the door as black as a sweep's, great lumps of soot all over it, and said that the stove had exploded right into his face ; he was only going to look if it was burning rightly, and the whole fiendish thing flew out at him. A stream of words not unmingled with oaths flowed like peas out of a sack, while the rest of us yelled with laughter. In the galley it was easy to see that something had happened ; the walls were covered with soot in lumps and stripes pointing towards the fire-place. The explanation of the accident was simple enough. The draught had been insufficient, and a quantity of gas had formed which had not been able to burn until air was let in by Pettersen opening the door.

"This is a good beginning. I told Pettersen in the evening that I would do the cooking myself next day, when the real trial was to be made. But he would not hear of such a thing ; he said 'I was not to think that he minded a trifle like that ; I might trust to its being all right'—and it *was* all right. From that day I heard nothing but praise of the new apparatus, and it was used until the *Fram* was out in the open sea again.

* Pettersen had been advanced from smith to cook, and he and Juell took turns of a fortnight each in the galley.

PETTERSEN AFTER THE EXPLOSION.

"Thursday, September 6th. 81° 13·7′ N. lat. Have I been married five years to-day? Last year this was a day of victory—when the ice-fetters burst at Taimur Island—but there is no thought of victory now; we are not so far north as I had expected; the north-west wind has come again, and we are drifting south. And yet the future does not seem to me so long and so dark as it sometimes has done. Next September 6th, ... can it be possible that then every fetter will have burst, and we shall be sitting together talking of this time in the far north and of all the longing, as of something that once was and that will never be again. The long, long night is past; the morning is just breaking, and a glorious new day lies before us. And what is there against this happening next year? Why should not this winter carry the *Fram* west to some place north of Franz Josef Land? . . and then my time has come, and off I go with dogs and sledges—to the north. My heart beats with joy at the very thought of it. The winter shall be spent in making every preparation for that expedition, and it will pass quickly.

"I have already spent much time on these preparations. I think of everything that must be taken, and how it is to be arranged, and the more I look at the thing from all points of view, the more firmly convinced do I become that the attempt will be successful, if only the *Fram* can get north in reasonable time, not too

late in the spring. If she could just reach 84° or 85°, then I should be off in the end of February or the first days of March, as soon as the daylight comes, after the long winter night, and the whole would go like a dance. Only four or five months, and the time for action will have come again. What joy! When I look out over the ice now, it is as if my muscles quivered with longing to be striding off over it in real earnest—fatigue and privation will then be a delight. It may seem foolish that I should be determined to go off on this expedition, when, perhaps, I might do more important work quietly here on board. But the daily observations will be carried on exactly the same.

"I have celebrated the day by arranging my work-room for the winter. I have put in a petroleum stove, and expect that this will make it warm enough even in the coldest weather, with the snow walls that I intend to build round the outside of it, and a good roof-covering of snow. At least, double the amount of work will be done if this cabin can be used in winter, and I can sit up here instead of in the midst of the racket below. I have such comfortable times of it now, in peace and quietness, letting my thoughts take their way unchecked.

"Sunday, September 9th. 81° 4′ N. lat. The midnight sun disappeared some days ago, and already the sun sets in the north-west; it is gone by 10 o'clock in the evening, and there is once more a glow over the eternal white. Winter is coming fast.

"Another peaceful Sunday, with rest from work, and a little reading. Out snow-shoeing to-day I crossed several frozen-over lanes, and very slight packing has begun here and there. I was stopped at last by a broad open lane lying pretty nearly north and south; at places it was 400 to 500 yards across, and I saw no end to it either north or south. The surface was good; one got along quickly, with no exertion at all when it was in the direction of the wind.

"This is undeniably a monotonous life. Sometimes it feels to me like a long dark night, my life's 'Ragnarok.'* dividing it into two. . . . . 'The sun is darkened, the summers with it, all weather is weighty with woe'; snow covers the earth, the wind whistles over the endless plains, and for three years this winter lasts, till comes the time for the great battle, and 'men tramp Hel's way.' There is a hard struggle between life and death; but after that comes the reign of peace. The earth rises from the sea again, and decks itself anew with verdure. 'Torrents roar, eagles hover over them watching for fish among the rocks,' and then 'Valhalla,' fairer than the sun and long length of happy days.

"Pettersen, who is cook this week, came in here this evening, as usual, to get the bill of fare for next day. When his business was done, he stood for a minute, and then said that he had had such a strange dream last

* "Twilight of the gods."

night; he had wanted to be taken as cook with a new expedition, but Dr. Nansen wouldn't have him.

"'And why not?'

"'Well, this was how it was. I dreamed that Dr. Nansen was going off across the ice to the Pole with four men, and I asked to be taken, but you said that you didn't need a cook on this expedition, and I thought that was queer enough, for you would surely want food on this trip as well. It seemed to me that you had ordered the ship to meet you at some other place; anyhow you were not coming back here, but to some other land. It's strange that one can lie and rake up such a lot of nonsense in one's sleep.'

"'That was perhaps not such very great nonsense, Pettersen; it is quite possible that we might have to make such an expedition, but if we did, we should certainly not come back to the *Fram*.'

"'Well, if that happened, I would ask to go, sure enough; for it's just what I should like. I'm no great snow-shoer, but I would manage to keep up somehow.'

"'That's all very well; but there's a great deal of weary hard work on a journey like that; you needn't think it's all pleasure.'

"'No, no one would expect that; but it would be all right if I might only go.'

"'But there might be worse than hardships, Pettersen. It would more than likely mean risking your life.'

"'I don't care for that either. A man has got to die some time.'

"'Yes, but you don't want to shorten your life?'

"'Oh, I would take my chance of that. You can lose your life at home, too, though, perhaps, not quite so easily as here. But if a man was always to be thinking about that he would never do anything.'

"'That's true. Anyhow he would not need to come on an expedition like this. But remember that a journey northward over the ice would be no child's play.'

"'No, I know that well enough, but if it was with you I shouldn't be afraid. It would never do if we had to manage alone. We'd be sure to go wrong; but it's quite a different thing, you see, when there is one to lead that you know has been through it all before.'

"It is extraordinary the blind faith such men have in their leader! I believe they would set off without a moment's reflection if they were asked to join in an expedition to the Pole now, with black winter at the door. It is grand as long as the faith lasts, but God be merciful to him on the day that it fails!"

"Saturday, September 15th. This evening we have seen the moon again for the first time—beautiful full moon, and a few stars were also visible in the night sky, which is still quite light.

"Notices were posted up to-day in several places. They ran as follows:—

"As fire here on board might be followed by the most terrible consequences, too great precaution cannot

be taken. For this reason every man is requested to observe the following rules *most conscientiously* :—

1. No one is to carry matches.
2. The only places where matches may be kept are :—
   (1) The galley, where the cook for the time being is responsible for them.
   (2) The four single cabins, where the inmate of each is responsible for his box.
   (3) The work-cabin, when work is going on.
   (4) On the mast in the saloon, from which neither box nor single matches must be taken away under any circumstances.
3. Matches must not be struck anywhere except in the places above named.
4. The one exception to the above rules is made when the forge has to be lighted.
5. All the ship's holds are to be inspected every evening at 8 o'clock by the fire-inspector, who will give in his report to the undersigned. After that time no one may, without special permission, take a light into the holds or into the engine-room.
6. Smoking is only allowed in the living-rooms and on deck. Lighted pipes or cigars must on no account be seen elsewhere.

FRIDTJOF NANSEN.

Fram, September 15th, 1894.

"Some of these regulations may seem to infringe on the principle of equality which I have been so anxious to maintain; but these seem to me the best arrangements I can make to ensure the good of all—and that must come before everything else."

"Friday, September 21st. We have had tremendously strong wind from the north-west and north for some days, with a velocity at times of 39 and 42 feet. During this time we must have drifted a good way south. 'The Radical Right' had got hold of the helm, said Amundsen; but their time in power was short; for it fell calm yesterday, and now we are going north again, and it looks as if the 'Left' were to have a spell at the helm, to repair the wrongs done by the 'Right.'

"Kennels for the dogs have been built this week—a row of splendid ice-houses along the port side of the ship; four dogs in each house; good warm winter quarters. In the meantime our eight little pups are thriving on board; they have a grand world to wander round—the whole fore-deck, with an awning over it. You can hear their little barks and yelps as they rush about among shavings, hand-sledges, the steam-winch, mill axle, and other odds and ends. They play a little, and they fight a little, and forward under the forecastle they have their bed among the shavings, a very cosy corner, where 'Kvik' lies stretched out like a lioness in all her majesty. There they tumble over each other in a heap round her, sleep, yawn, eat, and pull each other's

tails. It is a picture of home and peace here near the Pole, which one could watch by the hour.

"Life goes its regular, even, uneventful way, quiet as the ice itself; and yet it is wonderful how quickly the time passes. The equinox has come, the nights are beginning to turn dark, and at noon the sun is only 9 degrees above the horizon. I pass the day busily here in the work cabin, and often feel as if I were sitting in my study at home, with all the comforts of civilisation round me. If it were not for the separation, one could be as well off here as there. Sometimes I forget where I am. Not infrequently in the evening, when I have been sitting absorbed in work, I have jumped up to listen when the dogs barked, thinking to myself: who can be coming? Then I remember that I am not at home, but drifting out in the middle of the frozen Polar Sea, at the commencement of the second long Arctic night.

"The temperature has been down to 1·4° F. below zero (— 17° C.) to-day; winter is coming on fast. There is little drift just now, and yet we are in good spirits. It was the same last autumn equinox; but how many disappointments we have had since then! How terrible it was in the later autumn when every calculation seemed to fail, as we drifted farther and farther south! Not one bright spot on our horizon! But such a time will never come again. There may still be great relapses; there may be slow progress for a time; but

there is no doubt as to the future; we see it dawning bright in the west, beyond the Arctic night."

"Sunday, September 23rd. It was a year yesterday since we made fast for the first time to the great hummock in the ice. Hansen improved the occasion by making a chart of our drift for the year. It does not look so very bad, though the distance is not great, the direction is almost exactly what I had expected. But more of this to-morrow; it is so late that I cannot write about it now. The nights are turning darker and darker; winter is settling down upon us."

"Tuesday, September 25th. I have been looking more carefully at the calculation of our last year's drift. If we reckon from the place where we were shut in on the 22nd of September last year, to our position on the 22nd of September this year, the distance we have drifted is 189 miles, equal to 3° 9′ lat. Reckoning from the same place, but to the farthest north point we reached in summer (July 16th), makes the drift 225 miles, or 3° 46′. But if we reckon from our most southern point in the autumn of last year (November 7th), to our most northern point this summer, then the drift is 305 miles, or 5° 5′. We got fully 4° north, from 77° 43′ to 81° 53′. To give the course of the drift is a difficult task in these latitudes, as there is a perceptible deviation of the compass with every degree of longitude as one passes east or west; the change, of course, given in degrees will be almost exactly the same as the number

of degrees of longitude that have been passed. Our average course will be about N. 36° W. The direction of our drift is consequently a much more northerly one than the *Jeannette's* was, and this is just what we expected; ours cuts hers at an angle of 59°. The line of this year's drift continued will cut the north-east island of Spitzbergen, and take us as far north as 84° 7′, in 75° E. long., somewhere N.N.E. of Franz Josef Land. The distance by this course to the North East Island is 827 miles. Should we continue to progress only at the rate of 189 miles a year, it would take us 4·4 years to do this distance. But assuming our progress to be at the rate of 305 miles a year, we shall do it in 2·7 years. That we should drift at least as quickly as this seems probable, because we can hardly now be driven back as we were in October last year, when we had the open water to the south, and the great mass of ice to the north of us.

"The past summer seems to me to have proved that while the ice is very unwilling to go back south, it is most ready to go north-west as soon as there is ever so little easterly, not to mention southerly wind. I therefore believe, as I always have believed, that the drift will become faster as we get farther north-west, and the probability is that the *Fram* will reach Norway in two years, the expedition having lasted its full three years, as I somehow had a feeling that it would. As our drift is 59° more northerly than the *Jeannette's*, and

as Franz Josef Land must force the ice north (taking for granted that all that comes from this great basin goes round to the north of Franz Josef Land), it is probable that our course will become more northerly the farther on we go, until we are past Franz Josef Land, and that we shall consequently reach a higher latitude than our drift so far would indicate. I hope 85° at least. Everything has come right so far ; the direction of our drift is exactly parallel with the course which I conjectured to have been taken by the floe with the *Jeannette* relics, and which I pricked out on the chart prepared for my London Address.* This course touched about 87½° N. lat. I have no right to expect a more northerly drift than parallel to this, and have no right to be anything but happy if I get as far. Our aim, as I have so often tried to make clear, is not so much to reach the point 'in which the earth's axis terminates,' as to traverse and explore the unknown Polar Sea ; and yet I should like to get to the Pole, too, and hope that it will be possible to do so, if only we can reach 84° or 85° by March—and why should we not ?"

" Thursday, September 27th. Have determined that, beginning from to-morrow, every man is to go out snow-shoeing two hours daily, from 11 to 1, so long as the

* See *Geographical Journal*, London, 1893. See also the map in *Naturen*, 1890, and the Norwegian Geographical Society's *Year Book*, I, 1890.

daylight lasts. It is necessary. If anything happened that obliged us to make our way home over the ice, I am afraid some of the company would be a terrible hindrance to us, unpractised as they are now. Several of them are first-rate snow-shoers, but five or six of them

SNOW-SHOE PRACTICE (SEPTEMBER 28TH, 1894).
(By H. Egidius, from a Photograph.)

would soon be feeling the pleasures of learning; if they had to go out on a long course, and without snow-shoes, it would be all over with us.

"After this we used to go out regularly in a body. Besides being good exercise, it was also a great pleasure; every one seemed to thrive on it, and they all became

accustomed to the use of the shoes on this ground, even though they often got them broken in the unevennesses of the pressure-ridges ; we just patched and riveted them together to break them again."

RETURN FROM A SNOW-SHOE RUN (SEPTEMBER 28TH, 1894).
(From a Photograph.)

"Monday, October 1st. We tried a hand-sledge to-day with a load of 250 lbs. It went along easily, and yet was hard to draw, because the snow-shoes were apt to slip to the side on the sort of surface we had. I almost

believe that Indian snow-shoes would be better on this ground, where there are so many knobs and smooth hillocks to draw the sledges over. When Amundsen first began to pull the sledge, he thought it was nothing at all; but when he had gone on for a time, he fell into a fit of deep and evidently sad thought, and went silently home. When he got on board, he confided to the others that if a man had to draw a load like that, he might just as well lie down at once—it would come to the same thing in the end. That is how practice is apt to go. In the afternoon I yoked three dogs to the same little sledge with the 250 lbs. load, and they drew it along as if it were nothing at all."

"Tuesday, October 2nd. Beautiful weather, but coldish; 49° F. of frost (−27° C.) during the night, which is a good deal for October, surely. It will be a cold winter if it goes on at the same rate. But what do we care whether there are 90° of frost or 120°? A good snow-shoeing excursion to-day. They are all becoming most expert now; but darkness will be on us presently, and then there will be no more of it. It is a pity; this exercise is so good for us—we must think of something to take its place.

"I have a feeling now as if this were to be my last winter on board. Will it really come to my going off north in spring? The experiment in drawing a loaded hand-sledge over this ice was certainly anything but promising; and if the dogs should not hold out, or

should be of less use than we expect; and if we should come to worse ice instead of better—well, we should only have ourselves to trust to. But if we can just get so far on with the *Fram* that the distance left to be

From a] BLOCK OF ICE (SEPTEMBER 28TH, 1894). [*Photograph.*

covered is at all a reasonable one, I believe that it is my duty to make the venture, and I cannot imagine any difficulty that will not be overcome when our choice lies between death—and onward and home!"

"Thursday, October 4th. The ice is rather impassable in places, but there are particular lanes or tracts; taking it altogether, it is in good condition for sledging and snow-shoeing, though the surface is rather soft, so that the dogs sink in a little. This is probably chiefly owing to there having been no strong winds of late, so that the snow has not been well packed together.

"Life goes on in the regular routine; there is always some little piece of work turning up to be done. Yesterday the breaking in of the young dogs began.* It was just the three—'Barbara,' 'Freia,' and 'Susine.' 'Gulabrand' is such a miserable, thin wretch, that he is escaping for the present. They were unmanageable at first, and rushed about in all directions: but in a little while they drew like old dogs, and were altogether better than we expected. 'Kvik,' of course, set them a noble example. It fell to Mogstad's lot to begin the training, as it was his week for looking after the dogs. This duty is taken in turns now, each man has his week of attending to them both morning and afternoon.

"It seems to me that a very satisfactory state of feeling prevails on board at present, when we are just entering on our second Arctic night, which we hope is to be a longer, and probably also a colder one, than any people before us have experienced. There is appreciably less

* These were the puppies born on December 13th, 1893; only four of them were now alive.

light every day ; soon there will be none ; but the good spirits do not wane with the light. It seems to me that we are more uniformly cheerful than we have ever been. What the reason of this is I cannot tell ; perhaps

From a] THE WANING DAY (OCTOBER, 1894). [*Photograph.*

just custom. But certainly, too, we are well off—in clover, as the saying is. We are drifting gently, but it is to be hoped surely, on through the dark unknown Nivlheim, where terrified fancy has pictured all possible

horrors. Yet we are living a life of luxury and plenty, surrounded by all the comforts of civilisation. I think we shall be better off this winter than last.

"The firing apparatus in the galley is working splendidly, and the cook himself is now of opinion that it is an invention which approaches perfection. So we shall burn nothing but coal-oil there now; it warms the place well, and a good deal of the heat comes up here into the work-room, where I sometimes sit and perspire until I have to take off one garment after another, although the window is open and there are 30 odd degrees of cold outside. I have calculated that the petroleum which this enables us to keep for lighting purposes only, will last at least 10 years, though we burn it freely 300 days in the year. At present we are not using petroleum lamps at the rate assumed in my calculation, because we frequently have electric light; and then even here summer comes once a year, or, at any rate, something which we must call summer. Even allowing for accidents, such as the possibility of a tank springing a leak and the oil running out, there is still no reason whatever for being sparing of light, and every man can have as much as he wants. What this means can best be appreciated by one who, for a whole year, has felt the stings of conscience every time he went to work or read alone in his cabin, and burned a lamp that was not absolutely necessary, because he could have used the general one in the saloon.

"As yet the coals are not being touched, except for the stove in the saloon, where they are to be allowed to burn as much as they like this winter. The quantity thus consumed will be a trifle in comparison with our store of about 100 tons, for which we cannot well have any other use until the *Fram* once more forces her way out of the ice on the other side. Another thing that is of no little help in keeping us warm and comfortable, is the awning that is now stretched over the ship.* The only part I have left open is the stern, abaft the bridge, so as to be able to see round over the ice from there.

"Personally, I must say that things are going well with me; much better than I could have expected. Time is a good teacher: that devouring longing does not gnaw so hard as it did. Is it apathy beginning? Shall I feel nothing at all by the time ten years have passed? Oh! sometimes it comes on with all its old strength—as if it would tear me in pieces! But this is a splendid school of patience. Much good it does to sit wondering whether they are alive or dead at home; it only almost drives one mad.

"All the same. I never grow quite reconciled to this

* We had no covering over the ship the first winter, as we thought it would make it so dark, and make it difficult to find one's way about on deck. But when we put in one the second winter, we found that it was an improvement.

life. It is really neither life nor death, but a state between the two. It means never being at rest about anything or in any place—a constant waiting for what is coming; a waiting in which, perhaps, the best years of one's manhood will pass. It is like what a young boy sometimes feels when he goes on his first voyage. The life on board is hateful to him; he suffers cruelly from all the torments of sea-sickness; and being shut in within the narrow walls of the ship is worse than prison; but it is something that has to be gone through. Beyond it all lies the south, the land of his youthful dreams, tempting with its sunny smile. In time he arises, half dead. Does he find his south? How often it is but a barren desert he is cast ashore on!"

"Sunday, October 7th. It has cleared up this evening, and there is a starry sky and aurora borealis. It is a little change from the constant cloudy weather, with frequent snow-showers, which we have had these last days.

"Thoughts come and thoughts go. I cannot forget, and I cannot sleep. Everything is still; all are asleep. I only hear the quiet step of the watch on deck; the wind rustling in the rigging and the canvas, and the clock gently hacking the time in pieces there on the wall. If I go on deck there is black night, stars sparkling high overhead, and faint aurora flickering across the gloomy vault, and out in the darkness I can see the glimmer of the great monotonous plain of the ice, it is all

so inexpressibly forlorn, so far, far removed from the noise and unrest of men and all their striving. What is life thus isolated? A strange, aimless process; and man a machine which eats, sleeps, awakes; eats and sleeps again, dreams dreams, but never lives. Or is life really nothing else? And is it just one more phase of the eternal martyrdom, a new mistake of the erring human soul, this banishing of one's self to the hopeless wilderness, only to long there for what one has left behind? Am I a coward? Am I afraid of death? Oh, no! but in these nights such longing can come over one for all beauty, for that which is contained in a single word,' and the soul flees from this interminable and rigid world of ice. When one thinks how short life is, and that one came away from it all of one's own free will, and remembers, too, that another is suffering the pain of constant anxiety, 'true, true till death.' 'Oh, mankind, thy ways are passing strange! We are but as flakes of foam, helplessly driven over the tossing sea.'

"Wednesday, October 10th. Exactly 33 years old, then. There is nothing to be said to that, except that life is moving on, and will never turn back. They have all been touchingly nice to me to-day, and we have held fête. They surprised me in the morning by having the saloon ornamented with flags. They had hung the 'Union' above Sverdrup's place.* We accused Amundsen

* An allusion, no doubt, to his political opinions (*Trans.*).

of having done this, but he would not confess to it. Above my door and over Hansen's they had the pennant with *Fram* in big letters. It looked most festive when I came into the saloon, and they all stood up and wished me 'Many happy returns.' When I went on deck the flag was waving from the mizzen mast-head.

"We took a snow-shoeing excursion south in the morning. It was windy, bitter weather; I have not felt so cold for long. The thermometer is down to 24° F. below zero (−31° C.) this evening; this is certainly the coldest birthday I have had yet. A sumptuous dinner: 1. Fish-pudding. 2. Sausages and tongue, with potatoes, haricot beans, and peas. 3. Preserved strawberries, with rice and cream. Crown extract of malt. Then, to everyone's surprise, our doctor began to take out of the pocket of the overcoat he always wears, remarkable-looking little glasses—medicine glasses, measuring glasses, test glasses—one for each man, and lastly a whole bottle of Lysholmer liqueur, real native Lysholmer, which awakened general enthusiasm. Two drams of that per man was not so bad, besides a quarter of a bottle of extract of malt. Coffee after dinner, with a surprise in the shape of apple cake, baked by our excellent cook, Pettersen, formerly smith and engineer. Then I had to produce my cigars, which were also much enjoyed; and of course we kept holiday all the afternoon. At supper there was another surprise, a large birthday cake, from the same

baker, with the inscription: 'T. L. M. D.' (Til lykke med dagen, the Norwegian equivalent for: Wishing a happy birthday) '10.10.94.' In the evening came pine-apples, figs, and sweets. Many a worse birthday might be spent in lower latitudes than 81°. The evening is

From a] A SNOW-SHOE EXCURSION (OCTOBER, 1894). [*Photograph.*

passing with all kinds of merriment, every one is in good spirits; the saloon resounds with laughter—how many a merry meeting it has been the scene of!

"But when one has said good-night and sits here alone, sadness comes; and if one goes on deck, there are

the stars high overhead in the clear sky. In the south is a smouldering aurora arch, which from time to time sends up streamers; a constant restless flickering.

"We have been talking a little about this expedition, Sverdrup and I. When we were out on the ice in the afternoon he suddenly said: 'Yes, next October you will, perhaps, not be on board the *Fram*.' To which I had to answer that, unless the winter turned out badly, I probably should not. But still I cannot believe in this rightly myself.

"Every night I am at home in my dreams, but when the morning breaks I must again, like Helge, gallop back on the pale horse by the way of the reddening dawn, not to the joys of Valhalla, but to the realm of eternal ice:—

> "For thee alone Sigrun,
> Of the Sæva Mountain,
> Must Helge swim
> In the dew of sorrow."

"Friday, October 12th. A regular storm has been blowing from the E.S.E. since yesterday evening. Last night the mill went to bits; the teeth broke off one of the toothed wheels, which has been considerably worn by a year's use. The velocity of the wind was over 40 feet this morning, and it is long since I have heard it blow as it is doing this evening. We must be making good progress north just now. Perhaps October is not to be such a bad month as I expected from our experiences of last year. Was out snow-shoeing before

IN LINE FOR THE PHOTOGRAPHER.

dinner. The snow was whistling about my ears. I had not much trouble in getting back; the wind saw to that. A tremendous snow squall is blowing just now. The moon stands low in the southern sky, sending a dull glow through the driving masses. One has to hold on to one's cap. This is a real dismal polar night, such as one imagines it to oneself sitting at home far away in the south. But it makes me cheerful to come on deck, for I feel that we are moving onward.

"Saturday, October 13th. Same wind to-day; velocity up to 39 feet and higher, but Hansen has taken an observation this evening in spite of it. He is, as always, a fine, indefatigable fellow. We are going north-west (81° 32′ 8″ N. lat., 118° 28′ E. long.).

"Sunday, October 14th. Still the same storm going on. I am reading of the continual sufferings which the earlier Arctic explorers had to contend with for every degree, even for every minute, of their northward course. It gives me almost a feeling of contempt for us, lying here on sofas, warm and comfortable, passing the time reading, and writing, and smoking, and dreaming, while the storm is tugging and tearing at the rigging above us, and the whole sea is one mass of driving snow, through which we are carried degree by degree northwards to the goal our predecessors struggled towards, spending their strength in vain. And yet . . . .

'Now sinks the sun, now comes the night.'

"Monday, October 15th. Went snow-shoeing eastwards this morning, still against the same wind and the same snowfall. You have to pay careful attention to your course these days, as the ship is not visible any great distance, and, if you did not find your way back, well——. But the tracks remain pretty distinct, as the snow-crust is blown bare in most places, and the drifting snow does not fasten upon it. We are moving northwards, and meanwhile the Arctic night is making its slow and majestic entrance. The sun was low to-day; I did not see it because of banks of cloud in the south, but it still sent its light up over the pale sky. There the full moon is now reigning, bathing the great ice plain and the drifting snow in its bright light. How a night such as this raises one's thoughts! It does not matter if one has seen the like a thousand times before: it makes the same solemn impression when it comes again; one cannot free one's mind from its power. It is like entering a still, holy temple, where the spirit of nature hovers through the place on glittering silver beams, and the soul must fall down and adore—adore the infinity of the universe.

"Wednesday, October 17th. We are employed in taking deep-water temperatures. It is a doubtful pleasure at this time of year. Sometimes the water-lifter gets coated with ice, so that it will not close down below in the water, and has therefore to hang for ever so long each time; and sometimes it freezes tight

DEEP-WATER TEMPERATURE. "UP WITH THE THERMOMETER." 12 JULY, 1894.

(From a photograph.)

during the observation after it is brought up, so that the water will not run out of it into the sample bottles, not to mention all the bother there is getting the apparatus ready to lower. We are lucky if we do not require to take the whole thing into the galley every time to thaw it. It is slow work; the temperatures have sometimes to be read by lantern light. The water samples are not so reliable, because they freeze in the lifter. But the thing can be done, and we must just go on doing it. The same easterly wind is blowing, and we are drifting onwards. Our latitude this evening is about 81° 47′ N.

"Thursday, October 18th. I continue taking the temperatures of the water, rather a cool amusement with the thermometer down to — 29° C. (20·2° F. below zero) and a wind blowing. Your fingers are apt to get a little stiff and numb when you have to manipulate the wet or ice-covered metal screws with bare hands and have to read off the thermometer with a magnifying-glass in order to ensure accuracy to the hundredth part of a degree, and then to bottle the samples of water, which you have to keep close against your breast, to prevent the water from freezing. It is a nice business!

"There was a lovely aurora borealis at 8 o'clock this evening. It wound itself like a fiery serpent in a double coil across the sky. The tail was about 10° above the horizon in the north. Thence it turned off with many windings in an easterly direction, then round again, and westwards in the form of an arch

from 30° to 40° above the horizon, sinking down again to the west and rolling itself up into a ball, from which several branches spread out over the sky. The arches were in active motion, while pencils of streamers shot out swiftly from the west towards the east, and the whole serpent kept incessantly undulating into fresh curves. Gradually it mounted up over the sky nearly to the zenith, while at the same time the uppermost bend or arch separated into several fainter undulations, the ball in the north-east glowed intensely, and brilliant streamers shot upwards to the zenith from several places in the arches, especially from the ball and from the bend farthest away in the north-east. The illumination was now at its highest, the colour being principally a strong yellow, though at some spots it verged towards a yellowish-red, while at other places it was a greenish-white. When the upper wave reached the zenith, the phenomenon lost something of its brilliancy, dispersing little by little, leaving merely a faint indication of an aurora in the southern sky. On coming up again on deck later in the evening, I found nearly the whole of the aurora collected in the southern half of the sky. A low arch, 5° in height, could be seen far down in the south over the dark segment of the horizon. Between this and the zenith were four other vague, wavy arches, the topmost of which passed right across it; here and there vivid streamers shot flaming upwards, especially from the undermost arch in the south. No arch was to

be seen in the northern part of the sky, only streamers every here and there. To-night, as usual, there are traces of aurora to be seen over the whole sky; light mists or streamers are often plainly visible, and the sky seems to be constantly covered with a luminous veil,* in which every here and there are dark holes.

There is scarcely any night, or rather I may safely say there is no night, on which no trace of aurora can be discerned as soon as the sky becomes clear, or even when there is simply a rift in the clouds large enough for it to be seen; and as a rule we have strong light phenomena dancing in ceaseless unrest over the firmament. They mainly appear, however, in the southern part of the sky.

"Friday, October 19th. A fresh breeze from E.S.E. Drifting northwards at a good pace. Soon we shall probably have passed the long-looked-for 82° and that will not be far from 82° 27′, when the *Fram* will be the vessel that will have penetrated farthest to the north on this globe. But the barometer is falling; the wind probably will not remain in that quarter long, but

* This luminous veil, which was always spread over the sky, was less distinct on the firmament immediately overhead, but became more and more conspicuous near the horizon, though it never actually reached down to it; indeed, in the north and south it generally terminated in a low, faintly outlined arch over a kind of dark segment. The luminosity of this veil was so strong that through it I could never with any certainty distinguish the Milky Way.

will shift round to the west. I only hope for this once the barometer may prove a false prophet. I have become rather sanguine; things have been going pretty well for so long; and October, a month which last year's

ON THE AFTER-DECK OF THE "FRAM" (OCTOBER, 1894).
(From a Photograph.)

experience had made me dread, has been a month of marked advance, if only it doesn't end badly.

"The wind to-day, however, was to cost a life. The mill, which had been repaired after the mishap to the

cog-wheel the other day, was set going again. In the afternoon a couple of the puppies began fighting over a bone, when one of them fell underneath one of the cog-wheels on the axle of the mill, and was dragged in between it and the deck. Its poor little body nearly made the whole thing come to a standstill; and, unfortunately, no one was on the spot to stop it in time. I heard the noise, and rushed on deck; the puppy had just been drawn out nearly dead; the whole of its stomach was torn open. It gave a faint whine, and was at once put out of its misery. Poor little frolicsome creature! Only a little while ago you were gambolling around, enjoying an innocent romp with your brothers and sisters; then came the thigh-bone of a bear trundling along the deck from the galley; you and the others made a headlong rush for it, and now there you lie, cruelly lacerated and dead as a herring. Fate is inexorable!

"Sunday, October 31st. N. lat. 82° 0·2′; E. long. 114° 9′. It is late in the evening, and my head is bewildered, as if I had been indulging in a regular debauch, but it was a debauch of a very innocent nature.

"A grand banquet to-day to celebrate the eighty-second degree of latitude. The observation gave 82° 0·2′ last night, and we have now certainly drifted a little farther north. Honey-cakes (gingerbread) were baked for the occasion, first-class honey-cakes, too, you may take my word for it; and then, after a refreshing snow-shoe run, came a festal banquet. Notices were stuck up in the saloon

requesting the guests to be punctual at dinner-time, for the cook had exerted himself to the utmost of his power. The following deeply felt lines by an anonymous poet also appeared on a placard :—

'When dinner is punctually served at the time,
No fear that the milk soup will surely be prime ;
But the viands are spoilt if you come to it late,
The fish-pudding will lie on your chest a dead weight ;
What's preserved in tin cases, there can be no doubt,
If you wait long enough will force its way out,
Even meat of the ox, of the sheep, or of swine,
Very different in this from the juice of the vine !
Ramornie, and Armour, and Thorne, and Herr Thüs,
Good meats have preserved, and they taste not amiss ;
So I'll just add a word, friends, of warning to you :
If you want a good dinner, come at one, not at two.'

The lyric melancholy which here finds utterance must have been the outcome of many bitter disappointments, and furnishes a valuable internal evidence as to the anonymous author's profession. Meanwhile the guests assembled with tolerable punctuality, the only exception being your humble servant, who was obliged to take some photographs in the rapidly waning daylight. The menu was splendid : (1) ox-tail soup ; (2) fish-pudding with melted butter and potatoes ; (3) turtle with marrowfat, peas, etc., etc. ; (4) rice with multer (cloudberries) and cream. Crown malt extract. After dinner, coffee and honey-cakes. After supper, which also was excellent, there was a call for music, which was liberally supplied throughout the whole even-

THE RETURN OF SNOWSHOERS.

(*By A. Eiebakke, from a photograph.*)

ing by various accomplished performers on the organ, among whom Bentzen specially distinguished himself, his late experiences on the ice with the crank-handle* having put him in first-rate training. Every now and then the music dragged a bit, as though it were being hauled up from an abyss some 1,000 or 1,500 fathoms deep; then it would quicken and get more lively, as it came nearer to the surface. At last the excitement rose to such a pitch, that Pettersen and I had to get up and have a dance, a waltz, and a polka or two; and we really executed some very tasteful *pas de deux* on the limited floor of the saloon. Then Amundsen also was swept into the mazes of the dance, while the others played cards. Meanwhile refreshments were served in the form of preserved peaches, dried bananas, figs, honey-cakes, etc., etc. In short, we made a jovial evening of it, and why should we not? We are progressing merrily towards our goal, we are already half-way between the New Siberian Islands and Franz Josef Land, and there is not a soul on board who doubts that we shall accomplish what we came out to do; so long live merriment.

"But the endless stillness of the polar night holds its sway aloft; the moon, half full, shines over the ice, and the stars sparkle brilliantly overhead; there are no restless northern lights, and the south wind sighs mournfully through the rigging. A deep, peaceful stillness

* Used in hoisting up the lead-line.

prevails everywhere. It is the infinite loveliness of death —Nirvana."

"Monday, October 22nd. It is beginning to be cold now; the thermometer was — 34·6° C. (30·2° F. below zero) last night, and this evening it is — 36° C. (32·8° F. below zero).

"A lovely aurora this evening (11.30). A brilliant corona encircled the zenith with a wreath of streamers in several layers, one outside the other; then larger and smaller sheaves of streamers spread over the sky, especially low down towards S.W. and E.S.E. All of them, however, tended upwards towards the corona, which shone like a halo. I stood watching it a long while. Every now and then I could discern a dark patch in its middle, at the point where all the rays converged. It lay a little south of the Pole Star, and approached Cassiopeia in the position it then occupied. But the halo kept smouldering and shifting just as if a gale in the upper strata of the atmosphere were playing the bellows to it. Presently fresh streamers shot out of the darkness outside the inner halo, followed by other bright shafts of light in a still wider circle, and meanwhile the dark space in the middle was clearly visible; at other times it was entirely covered with masses of light. Then it appeared as if the storm abated, and the whole turned pale, and glowed with a faint whitish hue for a little while, only to shoot wildly up once more and to begin the same dance over again. Then the entire mass of

light around the corona began to rock to and fro in large waves over the zenith and the dark central point, whereupon the gale seemed to increase and whirl the streamers into an inextricable tangle, till they merged into a luminous vapour, that enveloped the corona and drowned it in a deluge of light, so that neither it, nor the streamers, nor the dark centre could be seen—nothing, in fact, but a chaos of shining mist. Again it became paler, and I went below. At midnight there was hardly anything of the aurora to be seen.

"Friday, October 26th. Yesterday evening we were in 82° 3′ N. lat. To-day the *Fram* is two years old. The sky has been overcast during the last two days, and it has been so dark at midday that I thought we should soon have to stop our snow-shoe expeditions. But this morning brought us clear, still weather, and I went out on a delightful trip to the westward, where there had been a good deal of fresh packing, but nothing of any importance. In honour of the occasion we had a particularly good dinner, with fried halibut, turtle, pork chops with haricot beans and green peas, plum-pudding (real burning plum-pudding for the first time) with custard sauce, and wound up with strawberries. As usual, the beverages consisted of wine (that is to say, lime-juice, with water and sugar) and Crown malt extract. I fear there was a general overtaxing of the digestive apparatus. After dinner, coffee and honey-cakes, with which Nordahl stood cigarettes. General holiday.

"This evening it has begun to blow from the north, but probably this does not mean much; I must hope so, at all events, and trust that we shall soon get a south wind again. But it is not the mild zephyr we yearn for, not the breath of the blushing dawn. No, a cold, biting south wind, roaring with all the force of the Polar Sea, so that the *Fram*, the two-year-old *Fram*, may be buried in the snowstorm, and all around her be but a reeking frost—it is this we are waiting for, this that will drift us onwards to our goal. To-day, then, *Fram*, thou art two years old. I said at the dinner-table that if a year ago we were unanimous in believing that the *Fram* was a good ship, we had much better grounds for that belief to-day, for safely and surely she is carrying us onwards, even if the speed be not excessive; and so we drank the *Fram's* good health and good progress. I did not say too much. Had I said all that was in my heart, my words would not have been so measured; for, to say the truth, we all of us dearly love the ship, as much as it is possible to love any impersonal thing. And why should we not love her? No mother can give her young more warmth and safety under her wings than she affords to us. She is indeed like a home to us. We all rejoice to return to her from out on the icy plains, and when I have been far away and have seen her masts rising over the everlasting mantle of snow, how often has my heart glowed with warmth towards her. To the builder of this home grateful thoughts often travel during the still nights.

He, I feel certain, sits yonder at home often thinking of us; but he knows not where his thought can seek the *Fram* in the great white tract around the Pole. But he knows his child; and though all else lose faith in her, he will believe that she will hold out. Yes, Colin Archer, could you see us now, you would know that your faith in her is not misplaced.

"I am sitting alone in my berth, and my thoughts glide back over the two years that have passed. What demon is it that weaves the threads of our lives, that makes us deceive ourselves, and ever sends us forth on paths we have not ourselves laid out, paths on which we have no desire to walk? Was it a mere feeling of duty that impelled me? Oh, no! I was simply a child yearning for a great adventure out in the unknown, who had dreamed of it so long that at last I believed it really awaited me; and it has, indeed, fallen to my lot, the great adventure of the ice, deep and pure as infinity, the silent, starlit polar night, nature itself in its profundity, the mystery of life, the ceaseless circling of the universe, the feast of death, without suffering, without regret, eternal in itself. Here in the great night thou standest in all thy naked pettiness, face to face with nature; and thou sittest devoutly at the feet of eternity, intently listening; and thou knowest God the all-ruling, the centre of the universe. All the riddles of life seem to grow clear to thee, and thou laughest at thyself that thou couldst be

consumed by brooding, it is all so little, so unutterably little. . . . . 'Whoso sees Jehovah dies.'

"Sunday, November 4th. At noon I had gone out on a snow-shoe expedition, and had taken some of the dogs with me. Presently I noticed that those that had been left behind at the ship began to bark. Those with me pricked up their ears, and several of them started off back, with 'Ulenka' at their head. Most of them soon stopped, listening and looking behind them to see if I were following. I wondered for a little while whether it could be a bear, and then continued on my way; but at length I could stand it no longer, and set off homewards, with the dogs dashing wildly on in front. On approaching the ship I saw some of the men setting off with guns; they were Sverdrup, Johansen, Mogstad, and Henriksen. They had got a good start of me in the direction in which the dogs were barking before I, too, got hold of a gun and set off after them. All at once I saw through the darkness the flash of a volley from those in front, followed by another shot, then several more, until at last it sounded like regular platoon firing. What the deuce could it be? They were standing on the same spot, and kept firing incessantly. Why on earth did they not advance nearer? I hurried on, thinking it was high time I came up with my snow-shoes to follow the game, which must evidently be in full flight. Meanwhile they advanced a little, and then there was another flash to be seen through the darkness, and so they went

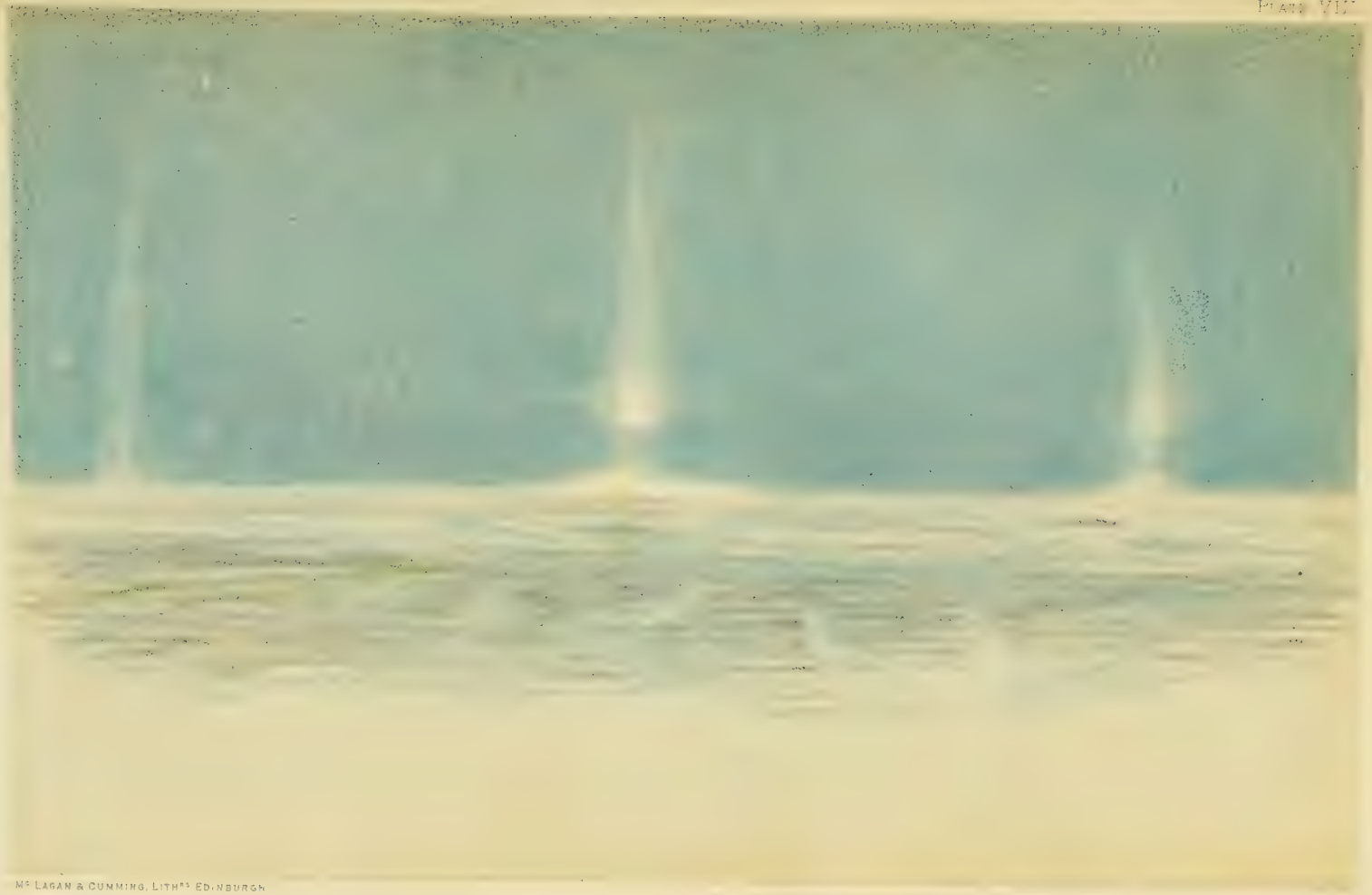
on two or three times. One of the number at last dashed forward over the ice and fired straight down in front of him, while another knelt down and fired towards the east. Were they trying their guns? But surely it was a strange time for doing so, and there were so many shots. Meanwhile the dogs tore around over the ice, and gathered in clumps, barking furiously. At length I overtook them, and saw three bears scattered over the ice, a she-bear and two cubs, while the dogs lay over them, worrying them like mad and tearing away at paws, throat, and tail. Ulenka especially was beside herself. She had gripped one of the cubs by the throat, and worried it like a mad thing, so that it was difficult to get her away. The bears had gone very leisurely away from the dogs, which dared not come to sufficiently close quarters to use their teeth till the old she-bear had been wounded and had fallen down. The bears, indeed, had acted in a very suspicious manner. It seemed just as if the she-bear had some deep design, some evil intent, in her mind, if she could only have lured the dogs near enough to her. Suddenly she halted, let the cubs go on in front, sniffed a little, and then came back to meet the dogs, who at the same time, as if at a word of command, all turned tail, and set off towards the west. It was then that the first shot was fired, and the old bear tottered and fell headlong, when immediately some of the dogs set to and tackled her. One of the cubs then got its quietus, while the other one was fired at and

made off over the ice, with three dogs after it. They soon overtook it and pulled it down, so that when Mogstad came up he was obliged first of all to get the dogs off before he could venture to shoot. It was a glorious slaughter, and by no means unwelcome, for we had that very day eaten the last remains of our last bear in the shape of meat cakes for dinner. The two cubs made lovely Christmas pork.

"In all probability these were the same bears whose tracks we had seen before. Sverdrup and I had followed on the tracks of three such animals on the last day of October, and had lost them to N.N.W. of the ship. Apparently they had come from that quarter now.

"When they wanted to shoot, Peter's gun, as usual, would not go off; it had again been drenched with vaseline, and he kept calling out: 'Shoot! shoot! Mine won't go off.' Afterwards, on examining the gun I had taken with me to the fray, I found there were no cartridges in it. A nice account I should have given of myself had I come on the bears alone with that weapon!

"Monday, November 5th. As I was sitting at work last night I heard a dog on the deck howling fearfully. I sprang up and found it was one of the puppies, that had touched an iron bolt with its tongue and was frozen fast to it. There the poor beast was, straining to get free, with its tongue stretched out so far that it looked like a thin rope proceeding out of its throat; and it was howling piteously. Bentzen, whose watch it was, had come up,



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MOONLIGHT, 22nd November 1893. Pastel Sketch.

portions of the moon-ring with mock moons visible on either hand.

but scarcely knew what to do. He took hold of it, however, by the neck, and held it close to the bolt, so that its tongue was less extended. After having warmed the bolt somewhat with his hand, he managed to get the tongue free. The poor little puppy seemed overjoyed at its release, and, to show its gratitude, licked Bentzen's hand with its bloody tongue, and seemed as if it could not be grateful enough to its deliverer. It is to be hoped that it will be some time before this puppy, at any rate, gets fast again in this way; but such things happen every now and then.

"Sunday, November 11th. I am pursuing my studies as usual day after day; and they lure me, too, deeper and deeper into the insoluble mystery that lies behind all these inquiries. Nay! why keep revolving in this fruitless circle of thought? Better go out into the winter night. The moon is up, great and yellow and placid; the stars are twinkling overhead through the drifting snow-dust. . . . Why not rock yourself into a winter night's dream, filled with memories of summer?

"Ugh, no! The wind is howling too shrilly over the barren ice-plains, there are 33 degrees of cold, and summer, with its flowers, is far, far away. I would give a year of my life to hold them in my embrace; they loom far away in the distance, as if I should never come back to them.

"But the northern lights, with their eternally shifting loveliness, flame over the heavens each day and each

night. Look at them; drink oblivion and drink hope from them: they are even as the aspiring soul of man. Restless as it, they will wreathe the whole vault of heaven with their glittering, fleeting light, surpassing all else in their wild loveliness, fairer than even the blush of dawn; but, whirling idly through empty space, they bear no message of a coming day. The sailor steers his course by a star. Could you but concentrate yourselves, you, too, oh, northern lights, might lend your aid to guide the wildered wanderer. But dance on, and let me enjoy you; stretch a bridge across the gulf between the present and the time to come, and let me dream far, far ahead into the future.

"Oh, thou mysterious radiance, what art thou, and whence comest thou? Yet why ask? Is it not enough to admire thy beauty and pause there? Can we at best get beyond the outward show of things? What would it profit even if we could say that it is an electric discharge or currents of electricity through the upper regions of the air, and were able to describe in minutest detail how it all came to be? It would be mere words. We know no more what an electric current really is, than what the aurora borealis is. Happy is the child. . . . We, with all our views and theories, are not in the last analysis a hair's-breadth nearer the truth than it.

"Tuesday, November 13th. Thermometer $-38°$ C. ($-36{\cdot}4°$ F.). The ice is packing in several quarters during the day, and the roar is pretty loud, now that the

ice has become colder. It can be heard from afar—a strange roar, which would sound uncanny to any one who did not know what it was.

"A delightful snow-shoe run in the light of the full moon. Is life a vale of tears? Is it such a deplorable fate to dash off like the wind, with all the dogs skipping around one, over the boundless expanse of ice through a night like this in the fresh, crackling frost, while the snow-shoes glide over the smooth surface, so that you scarcely know you are touching the earth, and the stars hang high in the blue vault above? This is more, indeed, than one has any right to expect of life; it is a fairy-tale from another world, from a life to come.

"And then to return home to one's cosy study-cabin, kindle the stove, light the lamp, fill a pipe, stretch oneself on the sofa, and send dreams out into the world with the curling clouds of smoke—is that a dire infliction? Thus I catch myself sitting staring at the fire for hours together, dreaming myself away—a useful way of employing the time. But at least it makes it slip unnoticed by, until the dreams are swept away in an ice-blast of reality, and I sit here in the midst of desolation, and nervously set to work again.

"Wednesday, November 14th. How marvellous are these snow-shoe runs through this silent nature The ice-fields stretch all around bathed in the silver moonlight; here and there dark, cold shadows project from the hummocks, whose sides faintly reflect the

twilight. Far, far out a dark line marks the horizon, formed by the packed-up ice, over it a shimmer of silvery vapour and above all the boundless deep blue, starry sky, where the full moon sails through the ether. But in the south is a faint glimmer of day low down of a dark, glowing red hue, and higher up a clear yellow and pale green arch, that loses itself in the blue above. The whole melts into a pure harmony, one and indescribable. At times one longs to be able to translate such scenes into music. What mighty chords, one would require to interpret them!

"Silent, oh, so silent! You can hear the vibrations of your own nerves. I seem as if I were gliding over and over these plains into infinite space. Is this not an image of what is to come? Eternity and peace are here. Nirvana must be cold and bright as such an eternal star-night. What are all our research and understanding in the midst of this infinity?

"Friday, November 16th. In the forenoon I went out with Sverdrup on snow-shoes in the moonlight, and we talked seriously of the prospects of our drift and of the proposed expedition northwards over the ice in the spring. In the evening we went into the matter more thoroughly in his cabin. I stated my views, in which he entirely coincided. I have of late been meditating a great deal on what is the proper course to pursue, supposing the drift does not take us so far north by the month of March as I had anticipated.

But the more I think of it, the more firmly am I persuaded that it is the thing to do. For if it be right to set out at 85°, it must be no less right to set out at 82° or 83°. In either case we should penetrate into more northerly regions than we should otherwise reach, and this becomes all the more desirable if the *Fram* herself does not get so far north as we had hoped. If we cannot actually reach the Pole, why, we must turn back before reaching it. The main consideration, as I must constantly repeat, is not to reach that exact mathematical point, but to explore the unknown parts of the Polar Sea, whether these be near to or more remote from the Pole. I said this before setting out, and I must keep it continually in mind. Certainly there are many importan observations to be made on board during the further drift of the ship, many which I would dearly like to carry on myself; but all the more important of these will be made equally well here, even though two of our number leave the ship; and there can scarcely be any doubt that the observations we shall make farther north will not many times outweigh in value those I could have made during the remainder of the time on board. So far, then, *it is absolutely desirable that we set out.*

"Then comes the question: What is the best time to start? That the spring, March at the latest, is the only season for such a venture, there can be no doubt at all. But shall it be next spring? Suppose, at the worst,

we have not advanced farther than to 83° N. lat. and 110° E. long. ; then something might be said for waiting till the spring of 1896 ; but I cannot but think that we should thus in all probability let slip the propitious moment. The drifting could not be so wearingly slow but that after another year had elapsed we should be far beyond the point from which the sledge expedition ought to set out. If I measure the distance we have drifted from November of last year with the compasses and mark off the same distance ahead, by next November we should be north of Franz Josef Land, and a little beyond it. It is conceivable, of course, that we were no farther advanced in February, 1896, either ; but it is more likely from all I can make out, that the drift will increase rather than diminish as we work westwards, and consequently in February, 1896, we should have got too far ; while, even if one could imagine a better starting-point than that which the *Fram* will probably offer us by March 1st, 1895, it will, at all events, be a possible one. It must consequently be the safest plan *not to wait for another spring*.

"Such then are the prospects before us of pushing through. The distance from this proposed starting-point to Cape Fligely, which is the nearest known land, I set down at about 370 miles,* consequently not much more

* There must be an error here, as the distance to Cape Fligely from the point proposed, 83° N. lat. and 110° E. long., is quite 460 miles ; I had probably taken the longitude as 100° instead of 110°.

than the distance we covered in Greenland, and that would be easy work enough over this ice, even if it did become somewhat bad towards land. If once a coast is reached, any reasonable being can surely manage to subsist by hunting, whether large or small game, whether bears or sandhoppers. Thus we can always make for Cape Fligely or Petermann's Land, which lies north of it, if our situation becomes untenable. The distance will, of course, be increased the farther we advance northwards, but at no point whatever between here and the Pole is it greater than we can and will manage, with the help of our dogs. 'A line of retreat' is therefore secured, though there are those doubtless who hold that a barren coast, where you must first scrape your food together before you can eat it, is a poor retreat for hungry men; but that is really an advantage, for such a retreat would not be too alluring. A wretched invention, forsooth, for people who wish to push on, is a 'line of retreat,' an everlasting inducement to look behind, when they should have enough to do in looking ahead.

"But now for the expedition itself. It will consist of 28 dogs, two men, and 2,100 lbs. of provisions and equipments. The distance to the Pole from 83° is 483 miles. Is it too much to calculate that we may be able to accomplish that distance in 50 days? I do not of course know what the staying powers of the dogs may be; but that, with two men to help, they should be able

to do $9\frac{1}{2}$ miles a day with 75 lbs. each for the first few days, sounds sufficiently reasonable, even if they are not very good ones. This, then, can scarcely be called a wild calculation, always, of course, supposing the ice to be as it is here, and there is no reason why it should not be. It, indeed, steadily improves the farther north we get; and it also improves with the approach of spring. In 50 days, then, we should reach the Pole (in 65 days we went 345 miles over the inland ice of Greenland at an elevation of more than 8,000 feet without dogs and with defective provisions, and could certainly have gone considerably farther). In 50 days we shall have consumed a pound of pemmican a day for each dog,* that is 1,400 lbs. altogether; and 2 lbs. of provisions for each man daily is 200 lbs. As some fuel also will have been consumed during this time, the freight on the sledges will have diminished to less than 500 lbs., but a burden like this is nothing for 28 dogs to draw, so that they ought to go ahead like a gale of wind during the latter part of the time, and thus do it in less than the 50 days. However, let us suppose that it takes this time. If all has gone well, we shall now direct our course for the Seven Islands, north of Spitzbergen. That is 9°, or 620 miles.

* During the actual expedition the dogs had to be content with a much smaller daily ration, on an average scarcely more than 9 or 10 ozs.

But if we are not in first-rate condition, it will be safer to make for Cape Fligely or the land to the north of it. Let us suppose we decide on this route. We set out from the *Fram* on March 1st (if circumstances are favourable, we should start sooner), and therefore arrive at the Pole April 30th. We shall have about 500 lbs. of our provisions left, enough for another 50 days; but we can spare none for the dogs. We must, therefore, begin killing some of them, either for food for the others or for ourselves, giving our provisions to them. Even if my figures are somewhat too low, I may assume that by the time twenty-three dogs have been killed we shall have travelled 41 days, and still have five dogs left. How far south shall we have advanced in this time? The weight of baggage was, to begin with, less than 500 lbs., that is to say less than 18 lbs. for each dog to draw. After 41 days this will at least have been reduced to 280 lbs. (by the consumption of provisions and fuel and by dispensing with sundry articles of our equipment, such as sleeping-bags, tent, etc., etc., which will have become superfluous). There remain, then, 56 lbs. for each of the five dogs, if we draw nothing ourselves; and should it be desirable, our equipment might be still further diminished. With a burden of from 18 to 56 lbs. apiece (the latter would only be towards the end), the dogs would on an average be able to do $13\frac{4}{5}$ miles a day, even if the snow-surface should become somewhat more difficult. That is to say, we shall have gone 565 miles

to the south, or we shall be 18½ miles past Cape Fligely, on June 1st, with five dogs and nine days' provisions left. But it is probable, in the first place, that we shall long before this have reached land; and, secondly, so early as the first half of April the Austrians found open water by Cape Fligely and abundance of birds. Consequently in May and June we should have no difficulty as regards food, not to mention that it would be strange indeed if we had not before that time met with a bear, or a seal, or some stray birds.

"That we should now be pretty safe I consider as certain, and we can choose whichever route we please: either along the north-west coast of Franz Josef Land by Gillis Land towards North-East Island and Spitzbergen (and should circumstances prove favourable, this would decidedly be my choice), or we can go south through Austria Sound towards the south coast of Franz Josef Land, and thence to Novaya Zemlya or Spitzbergen, the latter by preference. We may, of course, find Englishmen on Franz Josef Land, but that we must not reckon on.

"Such, then, is my calculation. Have I made it recklessly? No, I think not. The only difficulty would be if during the latter part of the journey, in May, we should find the surface like that we had here last spring, at the end of May, and should be considerably delayed by it. But this would only be towards the very end of our time, and at worst it could not be entirely impassable.

Besides, it would be strange if we could not manage to average 11½ miles a-day during the whole of the journey, with an average load for each dog of from 30 to 40 lbs.—it would not be more. However, if our calculations should prove faulty, we can always, as aforesaid, turn back at any moment.

"*What unforeseen obstacles may confront us?*

"1. The ice may be more impracticable than was supposed.

"2. We may meet with land.

"3. The dogs may fail us, may sicken, or freeze to death.

"4. We ourselves may suffer from scurvy.

"1 and 2. That the ice may be more impracticable further north is certainly possible, but hardly probable. I can see no reason why it should be, unless we have unknown lands to the north. But should this be so—very well, we must take what chance we find. The ice can scarcely be altogether impassable. Even Markham was able to advance with his scurvy-smitten people. And the coasts of this land may possibly be advantageous for an advance; it simply depends on their direction and extent. It is difficult to say anything beforehand, except that I think the depth of water we have here, and the drift of the ice render it improbable that we can have land of any extent at all close at hand. In any case there must, somewhere or other, be a

passage for the ice, and at the worst we can follow that passage.

"3. There is always a possibility that the dogs may fail us, but, as may be seen, I have not laid out any scheme of excessive work for them. And, even if one or two of them should prove failures, that could not be the case with all. With the food they have hitherto had they have got through the winter and the cold without mishap, and the food they will get on the journey will be better. In my calculations, moreover, I have taken no account of what we shall draw ourselves. And, even supposing all the dogs to fail us, we could manage to get along by ourselves pretty well.

"4. The worst event would undeniably be that we ourselves should be attacked by scurvy; and, notwithstanding our excellent health, such a contingency is quite conceivable, when it is borne in mind how in the English North Pole Expedition all the men, with the exception of the officers, suffered from scurvy when the spring and the sledge journeys began, although as long as they were on board ship they had not the remotest suspicion that anything of the kind was lying in wait for them. As far, however, as we are concerned, I consider this contingency very remote. In the first place, the English Expedition was remarkably unfortunate, and hardly any others can show a similar experience, although they may have undertaken sledge journeys of equal length—for example, M'Clintock's. During the retreat

of the *Jeannette* party, so far as is known, no one was attacked with scurvy. Peary and Astrup did not suffer from scurvy either. Moreover our supply of provisions has been more carefully selected, and offers greater variety than has been the case in former expeditions, not one of which has enjoyed such perfect health as ours. I scarcely think, therefore, that we should take with us from the *Fram* any germs of scurvy, and as regards the provisions for the sledge journey itself, I have taken care that they shall consist of good all-round, nutritious articles of food, so that I can scarcely believe that they would be the means of developing an attack of this disease. Of course, one must run some risk; but in my opinion all possible precautions have been taken, and, when that is done, it is one's duty to go ahead.

"There is yet another question that must be taken into consideration. Have I the right to deprive the ship and those who remain behind of the resources such an expedition entails? The fact that there will be two men less is of little importance, for the *Fram* can be handled quite as well with eleven men. A more important point is that we shall have to take with us all the dogs except the seven puppies; but they are amply supplied with sledge provisions and first-class sledge equipments on board, and it is inconceivable that in case anything happened to the *Fram* they should be unable to reach Franz Josef Land or Spitzbergen. It is scarcely likely that in case they had to abandon her, it would be

further north than 85° ; probably not even so far north. But suppose they were obliged to abandon her at 85°, it would probably be about north of Franz Josef Land, when they would be 207 miles from Cape Fligely ; or if further to the east it would be some 276 miles from the Seven Islands ; and it is hard to believe that they could not manage a distance like that with our equipments. Now, as before, I am of opinion that the *Fram* will in all probability drift right across the polar basin and out on the other side without being stopped, and without being destroyed ; but even if any accident should occur, I do not see why the crew should not be able to make their way home in safety, provided due measures of precaution are observed. Consequently, I think there is no reason why a sledge expedition should not leave the *Fram ;* and I feel that as it promises such good results it ought certainly to be attempted."

END OF VOL. I.

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